ANGLIA RUSKIN UNIVERSITY

LORD ASHCROFT INTERNATIONAL BUSINESS SCHOOL

THE INFLUENCE OF INFORMATION TECHNOLOGY ON TEACHING AND LEARNING STRATEGIES IN THE DELIVERY OF TERTIARY EDUCATION IN TRINIDAD AND TOBAGO

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ABSTRACT

LORD ASHCROFT INTERNATIONAL BUSINESS SCHOOL

DOCTOR OF BUSINESS ADMINISTRATION

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by AMELIA RAMROOP

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The rapid growth of computing technology internationally has resulted in millions interacting with computers on a daily basis. I am contending that the use of computers is having an influence on the education system in particular tertiary education.

This research focused on the delivery of tertiary education using ICT in Trinidad and Tobago. It highlighted the teaching strategies with the aid of ICT in the classroom to encourage the students to become fully engaged learners at tertiary educational institution in Trinidad and Tobago. It was also evident from the findings that each learner encapsulates a combination of all four categories of learning throughout his/her experience; however, one always comes to the forefront whilst learning. In order to enhance the learning process of the students in the various categories of learning, technology must be harnessed so as to support the learning process.

This research also capitalized on the positive attitudes that will be developed if lifelong learning is to be achieved by tertiary level students in Trinidad and Tobago. The challenges faced by society- locally, regionally and internationally- by adopting technology would become part of the curriculum in a way that students develop a positive attitude towards the usage of ICTs and consequently be able to engage in debates surrounding ICTs.

The outline approach to the research takes the form of a phenomenology philosophy a subjective ontology, an inductive approach and an exploratory design. The strategy adopted was that of a case study approach. The research was a cross-sectional study where a mixed method approach was utilized. The time horizon was one of a cross sectional. The data collection instrument used was questionnaires.

The findings of the research led to important propositions. There needs to be a shift from *'Education for ICT'* to the use of ***'ICT for Education'*** and for ICTs to be integrated throughout the curriculum, blending their use with other tools and resources to support student learning.

It involves using ICT to improve teaching and learning. The major emphasis of ICT infusion in pedagogy should be such that it tends to improve learning, motivate and engage learners, promote collaboration, foster enquiry and exploration, and create a new learner centred learning culture.

Key words: pedagogy, epistemology, learning styles, teaching, collaboration, ICT

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The influence of Information Technology on teaching and learning strategies in the delivery of tertiary education in Trinidad and Tobago

1.0 INTRODUCTION

1.1 BACKGROUND TO RESEARCH

In a society where technology is assuming a focal point in both the corporate world as well as in the home, emphasis must now be given not only to the information and communication technology (ICT) but also the impact it is having on individuals as citizens in this global village.

The rapid growth of computing technology internationally has resulted in millions of workers interacting with computers on a daily basis. The researcher contends that the use of computers has not only impacted on the automation and manufacturing processes but also on the working methods of the various services sector and especially in offices. More importantly, the researcher is postulating that it is having an influence on the education system. Rapid technological advancement has thus transformed the very core of doing things as we have known them.

The researcher also portends that in the international context with the introduction of computers in almost every aspect of economic activity has contributed significantly to increased efficiency and productivity and aroused immense interest and countless debates in the potential social, ethical and cultural ill effects on the very users of this advanced technology.

Applications of information and communications technologies are in fact making dramatic changes in economic as well as social development in countries around the world. These changes go beyond the increase in the number of computers visible in offices, at home and in the classrooms at learning institutions to the more fundamental changes that are apparent in the foundations of economic growth and more significantly the relationship to human capital.

Globalization and technological change have created a new global economy ***powered by technology, fuelled by information and driven by knowledge****.* In industrialized countries, the economic base is shifting from industry to information and as a result there is now a greater demand for new knowledge and skills in the workforce. ICTs have basically changed the very nature of work and the type of skills that were pre-requisites in the majority of professions and fields.

These tectonic economic and social changes have been characterized by terms such as *knowledge economy* and *learning society*, suggesting that learning and knowledge are at the heart of economic productivity as well as social development. Education is, in essence, the nucleus of the knowledge economy as well as the learning society.

Formal education is a prerequisite of the knowledge-based economy: the production and use of new knowledge both require a more (lifelong) educated population and workforce. Consequently, the role of ICT in schools in all educational institutions is also shifting radically.

ICT releases individuals' creative potential and knowledge. ICTs are in fact enablers of change they do not by themselves create transformations in society. They are best attributed as facilitators of knowledge creation in innovative societies (OECD, 1996).

The new economics looks at ICTs not as drivers of change but as releasing the creative potential and knowledge embodied in individuals. (Schön,1973).

Smith (2000) states that the *learning society* is an aspect that looks beyond formal educational environments and to locate learning as a quality not just of individuals but also an element of systems. Therefore, society must become adept at learning. Transformations must take place in our educational institutions in direct response to changing situations and requirements; institutions must invent and develop *"learning systems"*, that is, systems capable of bringing about their own continuing transformation (Schön,1973).

Embedding the use of ICT into the curriculum must be considered a key priority and part of national strategy for learning and in an online world by every developing country in the world. This is so because ICT has become an integral component of everyday activities in society. The importance of ICT in society has been underscored in *Enabling Our Future (Framework for the Future Steering Committee* (Australia, 2003) which identifies the citizenry as being central to economic and social gains, to improving productivity and efficiency and to building innovative capacity and competitiveness. (Tella and Adu,2009).

In addition, multinational organizations, for example, the Organization for Economic Cooperation and Development (ODEC 1998, 1999), the European Commission (1995,

2000) and the G8 nations (2000) have identified the need to prepare students for lifelong learning in the evolving knowledge economies and they have subsequently assigned ICT a focal role in accomplishing this goal.

Educational institutions worldwide are under ever-increasing pressure to adopt the new information and communication technologies to teach students the knowledge and skills required in the twenty first century. The 1998 UNESCO World Education Report, *Teachers and Teaching in a Changing World*, describes the major implications ICTs have for conventional teaching and learning. It predicts the transformation of the teaching-learning process and the way teachers and learners will gain access to information and ultimately knowledge.

It is imperative that educational institutions are no longer emphasizing task-specific skills but instead must focus on the development of learners' decision making and problem-solving skills and teaching them how to learn on their own as well as with others.

Critical pedagogy can then be termed as pedagogy which embraces a raising of consciousness, a critique of society, as valuing students' voices, as honouring students' needs, values and individuality as a hopeful, active pedagogy which enables students to become true participants of society who belong to society but more importantly able to create and re-create society.

Freire (1970) explains that there is no such thing as a neutral educational process. "Education either functions as an instrument that is used to facilitate the integration of the younger generation in to the logic of the present system and bring about conformity to it, or it becomes ‘the practice of freedom’ the means by which men and women deal critically and creatively with reality and discover how to participate in the transformation of their world. Apple also argues that education is not a neutral enterprise; by the very nature of the institution the educator is very involved whether consciously or not, in a political act.

The teaching profession is slowly evolving from an emphasis on teacher-centred, lecture-based, text book based instruction to student-centred, interactive learning environments (UNESCO, 1998). Teachers need to learn new skills and they themselves also need to become lifelong learners to keep up to date with new knowledge, pedagogical issues and technology. Designing and implementing successful ICT-enabled education programmes is the key to educators being more dynamic in their teaching strategies in the classroom.

To accomplish the goal of transforming the traditional paradigm of learning in the classroom (teacher-centred, lecture-based, text book based instruction to student-centred, interactive learning environment) educators must have an implicit understanding of how the new technologies operate and further how they are to create and subsequently impact on new learning environments in which students are fully engaged learners. Students will also be able to have greater responsibility for their learning as well as the construction of their own knowledge.

The traditional view of the learning process emerged out of the factory model of education at the turn of the twentieth century where large numbers of individuals were needed for low-skilled positions in industry. This method was highly effective in those times. The twenty to thirty students in a classroom were conceputalized along with the notion of standardized instruction for all and sundry. The traditional, teacher-centred approach demonstrated the concept that the teacher was the expert and the dispenser of knowledge and the students were the receptacle of the transmitted knowledge.

According to UNESCO (2002), there are six basic views of learning in the *traditional educational paradigm,* which are as follows:

- Learning is hard, often a difficult and tedious process.
- Learning is based on a deficit model of the student. The system attempts to identify the deficiencies and weaknesses of the students. The students are in turn tracked, categorized, remediated or failed.
- From the viewpoint of the educational philosophy of pedagogy - Learning is a process of information transfer and reception. It is ‘information oriented’ emphasizing that students usually reproduce knowledge rather than produce their own. The teacher is the dispenser of information and the student, acts as the passive receiver, storer and repeater of the transmitted information.
- Learning is an individual/solitary process.
- Learning is facilitated by breaking content/instructions into small isolated units.
- Learning is a linear process. The teacher usually provides only one linear path through a narrowly bounded content area or sequence of standardized instructional units.

The fundamental aim is “*to teach students how to learn”* rather than filling them with information, their skills should be developed to assimilate new environments and respond accordingly.

Many students are naturally enthusiastic about learning while others need to be motivated, challenged and inspired by their lecturers. They want to learn but most importantly they want to feel that learning is meaningful for them. There are many factors that can influence a student’s motivation to learn which may include an interest in the subject matter, perception of its usefulness, general desire to achieve, self-confidence, self-esteem, patience and persistence. On the other hand, some students maybe motivated by extrinsic incentives, for example, approval of family or peers or overcoming challenges.

The introduction of eLearning in education engendered high expectations that it would transform the organization and delivery of higher education. It prompted significant investments in starting up new virtual universities by universities in Europe and the United States including New York, Columbia and Cornell Universities and the US Open University. Numerous Virtual Universities such as the UK e-University, the Digital University in the Netherlands, the Bavarian Virtual University, the Virtual University in Finland, the Net-University in Sweden and the African Virtual University were launched.

1.2 BEST PRACTICE

1.2.1 WESTERN AUSTRALIAN DEPARTMENT OF EDUCATION: IMPACT of ICT on LEARNING and TEACHING

The context is the set of conditions currently prevailing or planned for Western Australian institutions. Principally the context is dominated by the implementation of the Western Australian Curriculum Framework that sets up an outcomes based approach to education within a developmental-constructivist view of learning. This focuses on what students do, think and understand rather than on the input of teachers and thus has ramifications for any evaluation of the use of ICT by students and teachers.

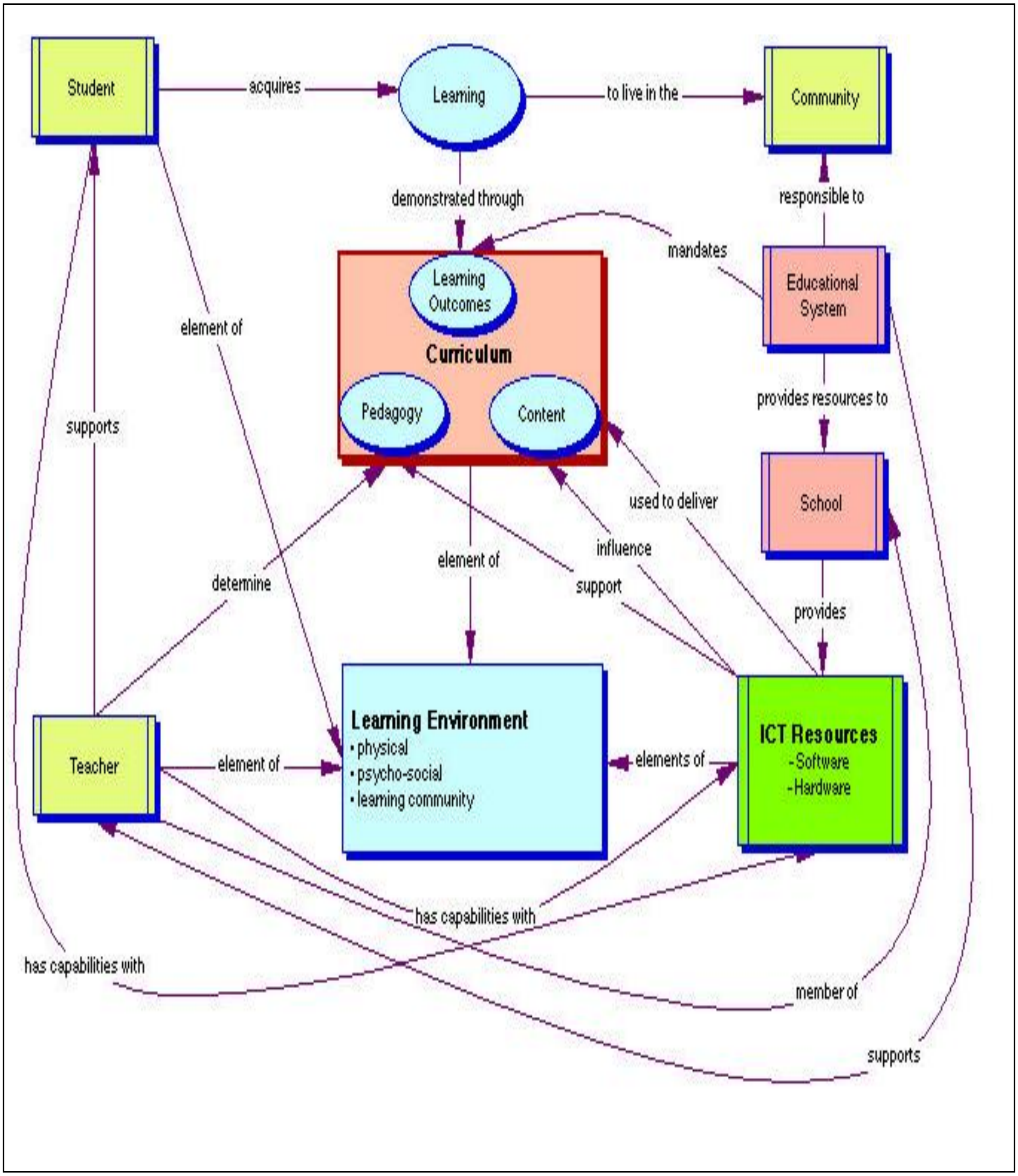


Fig 1.1: Concept map indicating relationships between learning environment entities and external entities Source: Newhouse (2002) – Impact of ICT on Learning and Teaching

- Education's aim is to incorporate computer support in the learning environment (DeCorte, 1990) rather than isolate its effect on learning.

  It is necessary to recognize that using computers in learning is concerned with methods of using the technology to create environments and learning situations.

- Given that the principal aim of education is to offer new learning opportunities and/or essentially to enhance the current learning activities. Therefore, in the actual implementation of computer applications it becomes imperative to begin with what a student, teacher or school wants to achieve.

Research according to Newhouse (2002) has revealed that:

- The use of ICT often encourages active learning and results in more authentic assessment
- The interactive and multimedia features within software can be used to help students come to grips with contents and ideas (Committee on Developments in the Science of Learning (2000))
- Provide tools to increase student productivity. Studies have indicated that students often learn more in less time, that is, their productivity increases when they use support appropriately (Schacter, 1999). Such tools are often referred to as Electronic Performance Support Software (EPSS)
- Computer systems provide a wider range of motivating situations in which students can develop and apply these higher level thinking skills (application, analysis and synthesis according to Bloom's taxonomy) and provide opportunities to develop

deep knowledge (Committee on Developments in the Science of Learning (2000); Schacter, 1999))

- Computer systems are also increasingly being used to provide learning experiences when and where needed thereby increasing the learner independence
- Use of ICT leads to more cooperation amongst learners within and beyond school and a more interactive relationship is formed between students and teachers
- The use of ICT to support collaborative and cooperative learning is extrapolated to the support of a learning community (Riel, 1998)
- The ranges of input and output devices that are now available provide opportunity for students to overcome physical disabilities in the same delivery activities as other students.

There is widespread support for use of computers in schools and there is also the belief that this should have a positive impact on students.

Newhouse (2002) has articulated three clear rationales for the effective implementation of ICT in schools:

1. Improve student achievement of learning outcomes across the curriculum,
2. Provide students with adequate ICT literacy, and
3. Increase the efficiency and effectiveness of schools as organizations.

The framework developed attempted to provide a method of addressing accountability in the use of ICT to support students in the achievement of learning outcomes across the curriculum. It also provided a guide for schools, educators and school systems in how to optimize the potential impact on Western Australian students learning of using ICT.

This has implications for:

- The organization of the curriculum.
- The organization and staffing of schools.
- The culture, policies and procedures of schools.
- The training and support of teachers.
- The provision of hardware and software infrastructure.

ACMA's (2008) research has clearly shown that change, connectivity and innovation are occurring at a rapid rate in Australia. It also suggests that the current trends in ICT are as follows:

- The accelerating pace of change
- Diversity in the development of physical infrastructure
- The spread of distributed connectivity
- Enhanced content and network management capabilities
- The emerging Social Web
- Continuing scientific and technological innovation

1.2.2 ICT IN UNIVERSITIES OF THE WESTERN HIMALAYAN REGION IN INDIA

India is in the forefront of the developing world as well as the South Asian region in terms of economic growth as well as scientific productivity. Research and Development establishments and institutions of higher learning in India are engaged in advanced studies, leading the development of new applications, new products and new technologies.

During the last decade there have been considerable strides in activities associated with information and communication technology in various universities and institutions of higher learning in India. The impetus at the national level was set in motion by the task force "Technology Information Forecasting and Assessment Council (TIFAC) for Technology Vision 2020. One of the very important pilot documents titled *"A Vision: for the new Millennium"* (1998) prepared by TIFCA, chaired by Dr A.P.J. Kalam provided a blueprint for the *"Technology Vision for India"*. According to Sharma and Singh (2009) this document highlighted the importance of ICT in that it can enhance critical thinking, information handling skills, level of perception, problem solving capability and adding value to research in educational institutions.

It not only highlighted the importance of higher educational institutions/universities to take prompt and appropriate initiatives but gave further direction for planning ICT strategies in which the role of higher educational institutions in India is going to be very critical.

This prompted the Government of India to take immediate steps to introduce an ICT initiative to lay down the ICT policy for the entire country especially at various levels through higher educational institutions/universities.

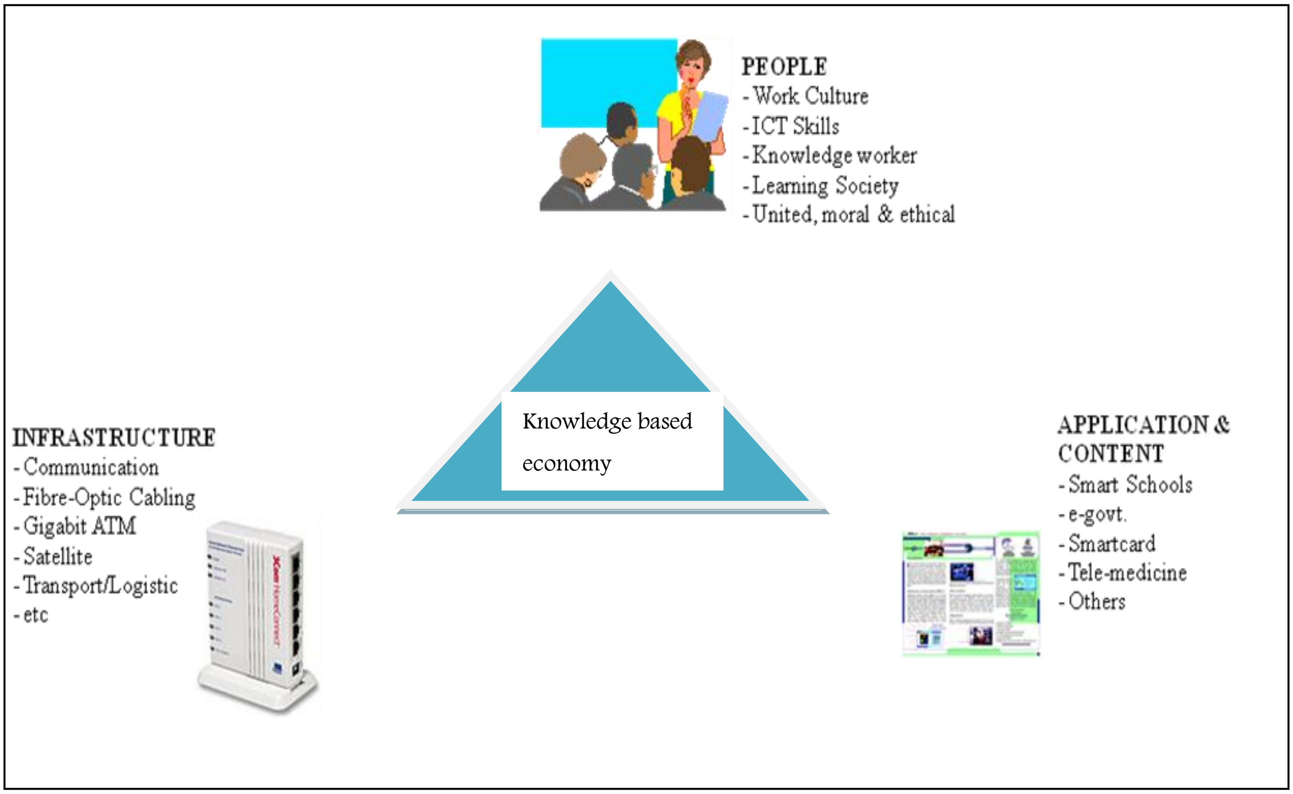


Fig 1.2: National ICT Agenda (India)

Source: The Role of ICT in Education: ***RTM TECHNOLOGIES PVT LTD***

This case study looked at the universities in the western Himalayan region in India. The region is typically a difficult terrain where people have to struggle for their livelihood, health and education. With this in mind the Government of India has paid particular attention to alleviate the level of education using the full potential of ICT in this region.

A framework was developed for assessing the initiative, status and performance and impact in the field of ICT in different universities and higher technical institution.

The framework is a four tier one where:

- **Tier I** looks at the vision and planning;
- **Tier II** looks at the infrastructure including hardware, software, and access to the Internet;
- **Tier III** is concerned with the main activities which can be further divided into primary activities of teaching and learning and advanced activities of training and research using ICT for developing professional skills; and
- **Tier IV** exhibits the impact of universities at the societal (local) level, at the national and international levels as well**.**

Findings from the study at the universities in the western Himalayan region in India indicated that vision and planning in Tier I are insufficient if these are not supported by proper initiative by a visionary at the highest level in the university system with full support from the government. It was also noted by Sharma and Singh (2009) that a good academic curriculum at the teaching level is a very significant component.

It further requires good infrastructure (Tier II) in hardware, software and also fast access to the internet. The universities are meant (Tier III) to create knowledge and the professionally skilled manpower trained, not at the local level but at the international level. The performance will result in sound impact (Tier IV) at the national and international levels.

Western Australian Department of Education and Universities of the Western Himalayan Region in India were chosen as the case studies for this research paper. Trinidad and Tobago is seen as the technological hub of the Caribbean and as such islands in the region were not considered.

On the other hand, Trinidad and Tobago has been using models from Australia and to a lesser extent India as case studies for economic development and overall governance of the country.

1.3 CARIBBEAN REGION

In the Caribbean region, higher education began to evolve in a distinctly discernible way after the end of World War II. In the first half of the twentieth century, higher education in the Caribbean was a privilege enjoyed by members of the upper class, public officials who benefited from scholarships or study leave, and exceptional Secondary school graduates who won scholarships to study at leading universities in the metropolitan countries.

Higher education in the region began to take on new dimensions in the second half of the twentieth century and a sector now referred to as the Tertiary Education Sector slowly began to emerge. Slow progress in the 1950s, 1960s and 1970s gave way to significant growth in the 1980s and thereafter mainly as a result of:

- The global liberalization of education leading, inter alia, to an increase in privately owned tertiary level institutions and an influx of foreign providers into the Caribbean region;
- The growing momentum for democratization of tertiary education in the region as manifested by increasing demands for access by regional governments, particularly those from territories not served by a physical university campus;
- Growing market demand as the information age became a reality, as the knowledge economy began to evolve and as skilled, knowledge workers became essential to building a competitive regional economy.

There are over one hundred and fifty (150) institutions of which 60% are public, 30% private and the remaining 10% exist with some governmental support.

The Prime Minister of St. Kitts and Nevis said in New York, United States of America on June 19, 2008, that *"the free movement of skills will no doubt accelerate the growth of Tertiary Level Institutions (TLI) in the region – and it is inevitable that a global knowledge economy and new developments such as the EPA will also have a positive impact on the growth of the tertiary sector and the knowledge sector generally".*

According to World Bank EdStats database and UNESCO UIS Statistics database in the Caribbean, Cuba has the highest Gross Enrolment Rate (GER) at the tertiary level (109%) followed by the British Virgin Islands (75%) and Barbados (53%). These rates are comparable to developed countries such as United States of America (82%) and United Kingdom (59%). In countries such as the Cayman Islands, Aruba and the

Dominican Republic enrolment rates fall between 20% and 35%. Other countries falling within that range include Brazil and Mexico. Countries with tertiary Gross Enrolment Rates of less than 20% include Jamaica (19%), Guyana (12%), Trinidad and Tobago (11%), St. Lucia (10%), Anguilla (5%) and Belize (3%).

1.4 TRINIDAD AND TOBAGO

The People's Partnership philosophy as outlined in its 2010 manifesto has stated, *"in order to be a competitive nation in the global knowledge economy we will link our diversification strategy to the creation of knowledge industries in order to create high-end jobs. This will be achieved by installing basic, technology-driven infrastructure so as to create the information superhighway to connect us locally, regionally and internationally."*

There are several challenges facing Trinidad and Tobago in becoming a knowledge based economy. There is a need for a cadre of skilled and competent professionals with good business ethics as productivity will be a key in the building process. There is also a need for an improved ICT infrastructure and legislative framework and also the political will to transform it into reality. Also the curriculum at the tertiary level needs to be infused with more ICTs and critical thinking so as to encourage innovation and meaningful transformation in the economy. (Trinidad and Tobago Chamber of Industry and Commerce, 2010)

Already home to international companies such as Cisco, Tata, McAfee and Microsoft, Trinidad and Tobago's technology community is ripe and positioned for growth. The ICT industry currently represents less than 3% of the nation's GDP (Trinidad and Tobago Chamber of Industry and Commerce, 2010). According to www.NationMaster.com for the period 18 December 2003 to18 December 2008, 98.9% of the population of Trinidad and Tobago is literate however, the Tertiary Gross Enrolment Rate is at 6.5%.

1.4.1 The School of Accounting and Management

The private tertiary educational institution chosen for this research paper is The School of Accounting and Management (SAM). SAM commenced operations in 1984 offering short courses in the field of Financial Accounting, Management, marketing and Cost Accounting. Over the years SAM has introduced numerous professional programmes in various fields of Accountancy, Business Management, Marketing, Computing, Banking, Law and Hotel Management. School of Accounting and Management was the first private institution in Trinidad and Tobago to offer globally recognized degrees in Business Management and Information Technology that are available full time, part time (evenings) and Saturday.

The school of Accounting and Management has encapsulated its vision statement as follows:

> *'To be a pioneering, entrepreneurial management, business and technological education institution within the Caribbean region, catering to the needs of the regional community and working with*

our strategic partners to improve relevant business education that will enhance the economic development of the region as it impacts the global environment'. (www.samtt.com)

Whilst the mission of the institution is as follows:

'SAM (Caribbean)Limited therefore aims to provide high quality and relevant tertiary education, with emphasis in the fields of business education and management learning and development at very competitive prices, leading to recognized undergraduate and postgraduate qualifications pursued on a full-time, part-time or workplace basis, thereby enabling students to enhance their knowledge and skills for the modern business, commercial and entrepreneurial work pursuits within a rapidly growing Caribbean workforce.' (www.samtt.com)

The Information Technology course at the undergraduate level is offered through the NCC Education UK and awarded by London Metropolitan University. NCC is the world's leading independent provider of IT training and education programmes.

The Business Management course at both the undergraduate and the postgraduate levels courses are validated by Anglia Ruskin University.

At the undergraduate level, the following pathways are available:

- BA (Hons) Management

- BA (Hons) Human Resource Management
- BA (Hons) Marketing
- BSc (Hons) Accounting and Finance
- BA (Hons) Corporate Management

At the postgraduate level, the following pathways are available:

- MBA Management
- MBA Leadership, Entrepreneurship and Innovation
- MBA Marketing
- MBA Human Resource Management

And the MSc Computer Studies include the various pathways:

- MSc Information Communication Technology (ICT)
- MSc Computer Science
- MSc Network Security
- MSc Mobile Telecommunication

Fig 1.3: School of Accounting and Management (SAM Caribbean Ltd)

Source: www.samtt.com

A concept that is gaining in momentum is blended learning. According to World Bank Institute (2010) blended learning has been defined as *"a learning approach that includes the use of appropriate combinations of information technologies-video conferencing, audio conferencing, Internet, CD-ROM, and other media, combined with appropriate learning technologies, on-site facilitated activities, and strong learner support systems".* Blended learning therefore refers to learning models that combine traditional classroom practice with e-learning solutions, for example, students in a traditional class can be assigned both print-based and on-line material, have on-line mentoring sessions with their lecturer through chat and are subscribed to a class email list or a web-based training course can be enhanced by face to face instructions.

Fig 1.4 : eLearning

"Blending" was prompted by recognition that all learning is best achieved by an electronically-mediated environment, particularly one that dispenses with live instructor altogether. Instead, consideration must be given to the subject matter, the learning outcomes, the characteristics of the learners and the learning context in order to arrive at the optimum mix of instructional and delivery methods (Tino, 2002).

Dziuban, Hartman, Moskal (2004) in their article entitled "Blended learning" have taken the position that blended learning should be viewed as a pedagogical approach that combines the effectiveness and socialization opportunities in the classroom with the technologically enhanced active learning possibilities of the online environment, rather than a ratio of delivery modalities. They further articulated that as a result blended learning should act as a fundamental redesign of the instructional model to include the following characteristics:

- A shift from lecture-to-student-centered instruction to one where students become active and interactive learners;

- Increases in interaction between student-instructor, student-student, student-content and student-outside; and
- Integrated formative and summative assessment mechanisms for students and instructors.

Fig 1.5: Use of computers in the classroom

Blended learning as it pertains to tertiary education has the potential to offer genuine transformation in the institutions. With regards to the courses, they require students to re-evaluate their role in education as the onus is now on them to manage their learning in an effective manner.

While at the same time, educators/instructors in blended learning evolve as designers of active learning subsequently becoming more facilitative in various teaching methods.

An interview was conducted with the Chief Academic Officer at School of Accounting and Management on 18th March 2010 with respect to the delivery methods utilized in the various programmes. The business management courses offered by the University of Anglia Ruskin at both the undergraduate and master's level use a combination the traditional learning paradigm in the classroom with the use of ICT in support of elibrary, online videos as well as the use of blackboard whereby there exists the "buddy" system. This system operates whereby the local lecturers are able to interact directly with the module leaders at the University of Anglia Ruskin. This has become an invaluable tool.

With regards to the Business Computing and Information Systems degree where SAM has partnered with London Metropolitan University at year 3, blended learning is an integral component of the course and students must interact with various forums - which enable students to participate in online discussions - as part of the overall assessment of various courses. The *“buddy”* system is also an essential component in this degree.

The MSc in Strategic Business Information Technology in conjunction with the University of Portsmouth, the first two parts of the course utilize the traditional delivery to students while the final year uses the blended approach especially the dissertation component is supervised online. The Henley University Masters course is a distance learning degree. Students prefer the traditional learning paradigm as blended learning is not yet compulsory. As a result the usage is somewhat limited. At the Henley’s masters courses it is observed that students find it extremely difficult to utilize the blended learning concept as there is a generation issue as the majority of students pursing this course is over fifty (50) years. However, with the recent intake of students it is observed that the students are more appreciative of the blended learning as they are part of the younger generation. It is interesting to note that students of BCIS courses have embraced the blended learning. This could be attributed to the fact these students belong to the younger generation.

It has been acknowledged by the Academic Council of School of Accounting and Management that the future of the institution will include more engaged blended learning in the various courses offered with more online video and interactive learning (a more visual approach to learning). Understanding the relevance of Bloom’s taxonomy in learning, blended learning will be incorporated into curriculum development and design.

It is critical that pedagogical and epistemological issues be discussed as an underlying foundation of different ICT applications in education.

1.5 RESEARCH TOPIC

The influence of Information Technology on teaching and learning strategies in the delivery of tertiary education in Trinidad and Tobago.

1.6 AIM OF RESEARCH

To identify the different categories of learners in the classroom and subsequently determine how Information Technology will influence both the learning and teaching strategies to all categories of learners in the classroom.

1.7 RESEARCH QUESTION

How can ICT enhance learning and teaching strategies at tertiary level institutions?

1.8 RESEARCH OBJECTIVES

Tertiary educational institutions play a significant role in preparing their students to deal with issues surrounding the appropriate use of technology in preparation of the world of work. This is a key component of a 21^{st} century education. Clearly communicated policies, a curriculum that incorporates technology usage issues and modeling of ethical behavior should be key components of any educational institution's effort to guide students through the complexities of this digital world.

This study sought to address these issues.

1. ***To analyze case relevance between epistemology and pedagogy in tertiary education***

   Epistemology is the philosophy of human knowledge. It is primarily concerned with origin, structure, methods and validity of human thinking whereas pedagogy looks at the activities that impart knowledge. The relevance of both epistemology and pedagogy in tertiary education in Trinidad and Tobago was ascertained in this research study.

2. ***To analyze how teaching methods and strategies have been influenced by IT.***

   Furthermore, to be successful in this Digital Age, it is imperative that students learn how to navigate through legal and ethical technology-related issues by themselves. Therefore educators must be conversant as well as equipped to guide them through this learning process in an objective manner.

3. ***To analyze how to develop positive attitudes towards technology usage that support lifelong learning and collaboration amongst students*.**

   The presence of technology in schools and classrooms and society at large, brings with it new challenges for ensuring responsible use in the education environment.

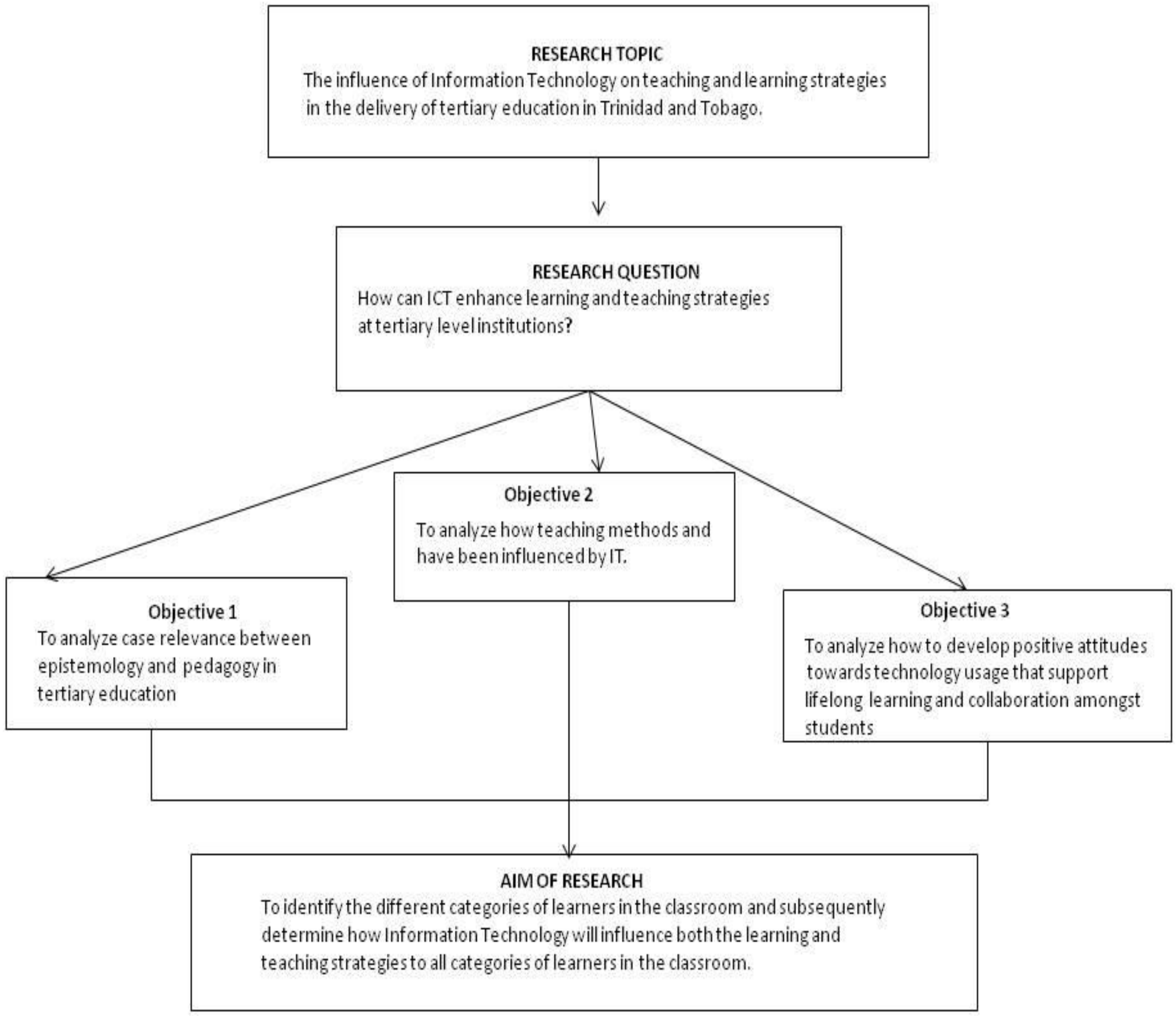


Fig 1.6: Research Framework (Researcher, 2016)

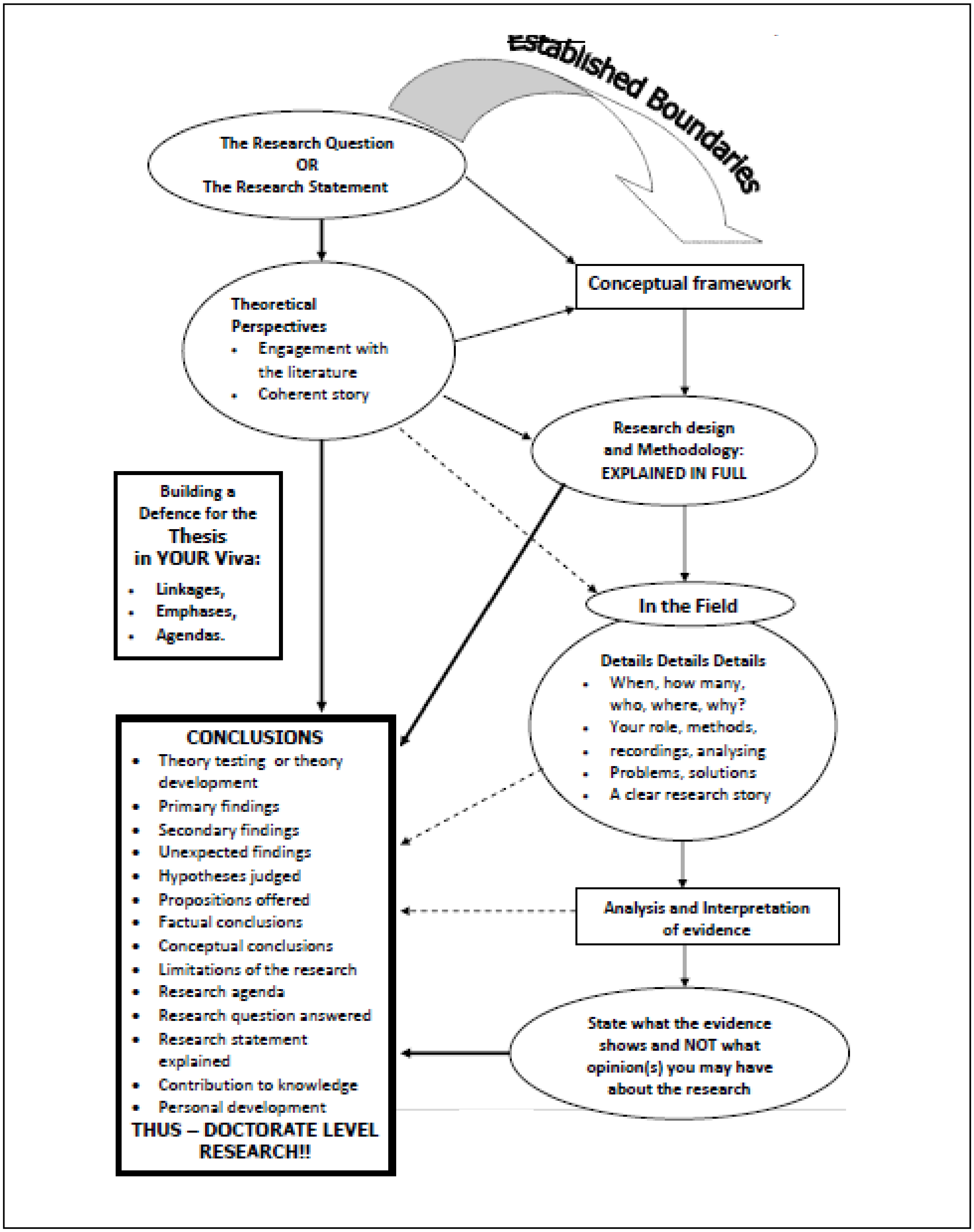


Fig 1.7: Research Framework (Anglia Ruskin University, 2014)

1.9 METHODOLOGY

A ***phenomenological approach*** was adopted as it is necessary to capture the views of the key participants and more importantly to analyze the phenomena critically from the participant's frame of reference. Furthermore, the problem under research is of a social science and human nature issue for which phenomenological paradigm is well adapted (Collis and Hussey, 2003).

The Ontological assumption was that of ***subjectivist***, where "reality is a projection of the human imagination" Collis and Hussey (2003:51). The reality or body of knowledge explored and evaluated was – *phenomena of influence of ICTs on teaching and learning strategies in the delivery of tertiary education in Trinidad and Tobago.*

This process of inquiry supported an ***Inductive approach*****,** which considered the individual inferences in a complex situation. For this research, the researcher collected ***qualitative data*** using data collection tool of questionnaires and analyzed the data quantitatively. A ***mixed-method approach*** was adopted for this research.

This research was conducted as a **cross sectional** investigation of ethical behaviour of students in tertiary educational institutions. This included extensive research of background papers as well as case studies which will form the basis of the Review of the Literature

Data were conducted on the private institution at the School of Accounting and Management, Caribbean Limited during the period March 2014 to May 2014. The sample was selected randomly in clusters which consisted of students studying Business Management as well as Information Technology courses from both the undergraduate and postgraduate levels. Six hundred and forty (640) questionnaires were distributed in total. Five hundred (500) questionnaires were distributed to undergraduate students studying Business Management and Information Technology courses in both the North and South Campuses. Eighty percent (80%) – four hundred (400) questionnaires – were completed by students and were subsequently returned to the researcher. One hundred and forty (140) questionnaires were distributed to post graduate (MBA and MSc) students and 71% (100 questionnaires) were completed and returned to the researcher.

1.10 INITIAL AREAS OF LITERATURE

Pedagogy has been defined by the Journal of the Association of Information Technology in Teacher Education as the art or profession of teaching; the activities of educating or instructing or teaching; principles and methods of instruction.

Technology, pedagogy and education seek to serve the international education community by supporting educators in the integration of ICT in teaching and learning.

Critical pedagogy was first theorized by educator Paulo Freire in his 1968 writing *"Pedagogy of the Oppressed"*. Since then many contemporary scholars have conceptualized and/or practiced critical pedagogy.

Critical pedagogy is an **educational philosophy** used to assist teachers and students dismantle power structures through real life problem posing and solutions. Accordingly they should produce a societal view that is true to real life and complicates and/or compliments their ideas of institutional and social structures.

Critical pedagogy considers how education can provide individuals with the tools to better themselves and strengthen democracy, to create a more egalitarian and just society and thus deploy education in a process of progressive social change (Kellner, 2000). Giroux (1994) went on to expound “critical pedagogy … signals how questions of audience, voice, power and evaluation work to construct particular relations between teachers and students, institutions and society and classrooms and communities. Pedagogy in the critical sense illuminates the relationship among knowledge, authority and power”.

Epistemology is the branch of philosophy that studies the origin, nature, methods, validity and limits of human knowledge.

The Perry (1970) scheme is a model for understanding how college students “come to know, the theories and beliefs they hold about knowing, and the manner in which such epistemological premises are a part of and an influence on the cognitive processes of thinking and reasoning” Perry (1970) proposed college students pass through a predictable sequence of stages of epistemological growth.

In the mid-1970s Maner defined the field of computer ethics as one which examines *“ethical problems aggravated, transformed or created by computer technology”.* He elucidated that many of the old ethical problems are in fact made worse by the use of computer systems whilst others are entirely new as a direct result of information technology. Maner’s attention was directed at the traditional ethical philosophers’ analyses using utilitarian ethics of Jeremy Bentham and John Stuart Mill as well as that of rationalist ethics of Immanuel Kant.

Johnson (1985), on the other hand, has defined the field as one which studies the way in which computers *"pose new versions of standard moral problems and moral dilemmas, exacerbating the old problems and forcing us to apply ordinary moral norms in uncharted realms".* Unlike Maner she did not believe that computers create new moral problems. In fact she added that she believed that computers indeed added a "new twist" to old ethical issues which were already well known.

Moor (1985) has purported that the computer revolution has taken place in two distinct stages. The first was that of ***technological introduction*** whereby the computer technology was developed and refined. The second stage is that of ***technological permeation*** whereby technology gets integrated into everyday human activities and into all social institutions, changing the very essence of fundamental concepts especially in education and the working environment.

Wiener (1950) took an alternative route. According to his account, *"computer ethics identifies and analyzes the impacts of information technology upon human values like health, wealth, opportunity, freedom, democracy, knowledge, privacy, security, and self-fulfillment"*. This very broad view embraces the disciplines of applied ethics, sociology of computing, technology assessment, and computer law. It also employs concepts, theories and methodologies from these relevant disciplines.

Potential problems with new technologies generally fall into the following categories: privacy, piracy, security, equality, and literacy. Although students may know right from wrong in general terms, it cannot be assumed that such understanding translates into new technological territory.

Thus the need arises to integrate all aspects of technology as well as media literacy, including responsible use, into the curriculum into the schools. Keeping this objective in mind, the International Society for Technology in Education (ISTE) and the U.S. Department of Education has published National Educational Technology Standards (NETS) for Students ("Connecting Curriculum and Technology") as a guide. Instead of treating technology as a stand-alone subject, the guide takes the approach of curriculum integration which involves *"the infusion of technology as a tool to enhance the learning in a content area or multidisciplinary setting*" (ISTE, 2000).

According to the article titled *“Information communication technology (ICT) and curriculum development: the challenges for education for sustainable development”* written by Tella and Adu for the Indian Journal of Science and Technology, March 2009 edition,

> *“Using technology as a tool for learning enables students to:*
>
> - *Efficiently and effectively access digital information to assist with investigating issues, solving problems and decision making;*
> - *Produce creative solutions to support learning and develop new understandings in areas of learning;*
> - *Communicate, share and work collaboratively in local and global environments understanding the legal, ethical and health*

and safety implications of using ICT and their responsibilities as users and developers; and

- *Develop new thinking and learning skills to support learning."*

Applying ICT as a tool for learning in curriculum areas will enable students to become competent, discriminating, creative and productive users of ICT.

1.11 REFLECTION ON PROFESSIONAL ACTIVITY

I am a full time lecturer at the School of Accounting and Management for the last seventeen years lecturing in the field of Information Technology. Bearing in mind the acceleration of ICT and its influence on the lives of individuals locally, regionally and internationally I have a better realization of how ICT will assist both students and lecturers gain a full comprehension of the course content. In that the use of ICT will further encourage students to perform at their optimal in the classroom. Research has made me recognize that other countries are attempting similar objectives to be introduced into their tertiary education systems.

The experience gained from this DBA programme will assist in supervision of dissertations both at the undergraduate and postgraduate levels at the School of Accounting and Management.

With the opening of the Management Institute by Anglia Ruskin University and School of Accounting and Management there will be the opportunity to participate in research initiatives and projects.

1.12 STRUCTURE OF THESIS

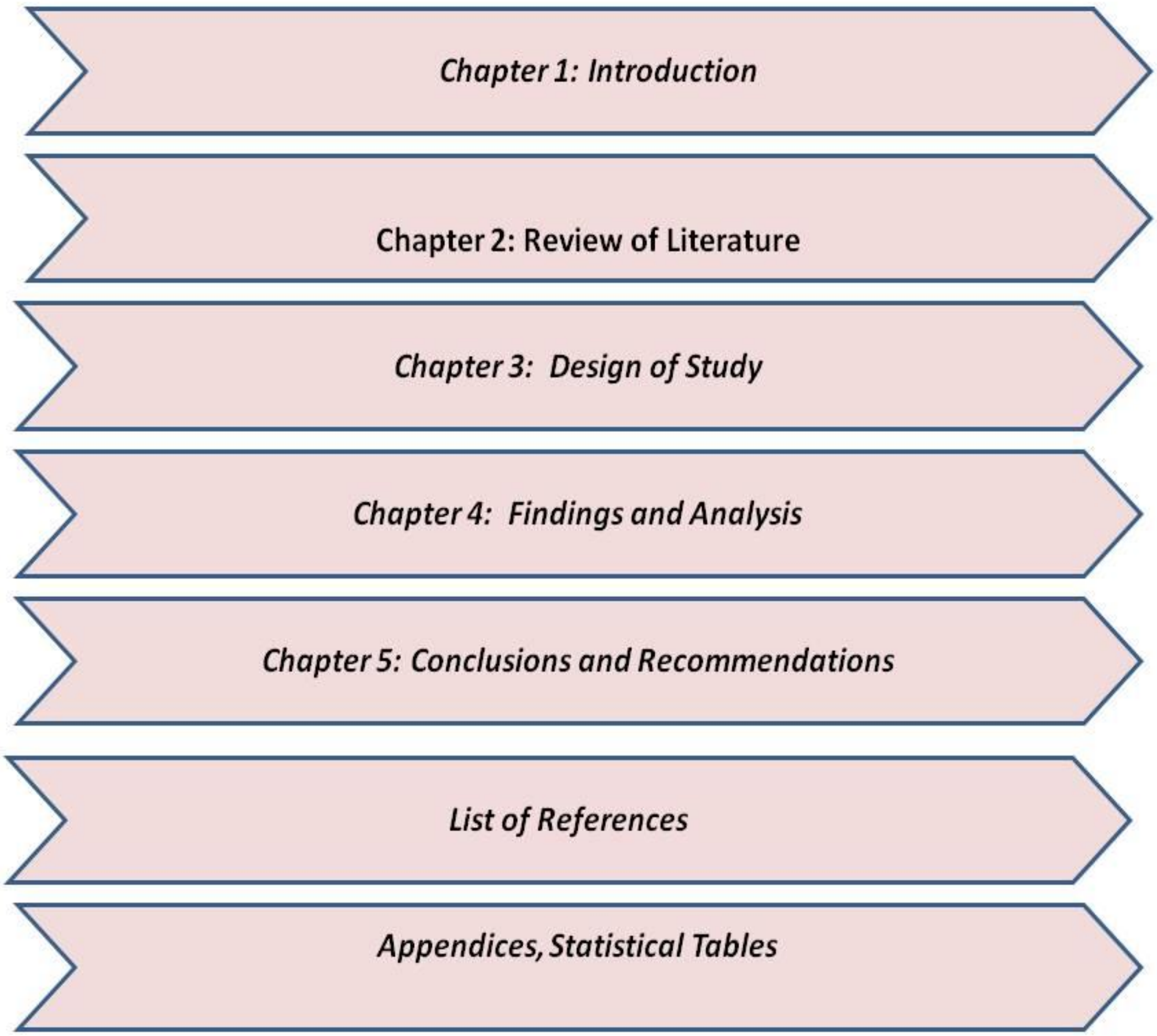


Fig 1.8: Structure of Thesis

2.0 REVIEW OF LITERATURE

2.1 INTRODUCTION

The rapid growth of computing technology internationally has resulted in millions interacting with computers on a daily basis. I am contending that the use of computers is having an influence on the education system in particular tertiary education. Multinational companies, for example, the Organization for Economic Cooperation and Development (ODEC 2012), the European Commission (1995, 2000) and the G8 Nations (2000) have identified the need to prepare students for lifelong learning in the evolving knowledge economies and they have assigned ICT as a focal role in accomplishing this goal.

It is imperative that educational institutions are no longer placing emphasis on task-specific skills but instead must now encourage the focus to be on the development of learners' decision making and problem-solving skills, and teaching them how to learn on their own as well as with others.

The teaching profession is slowly evolving from emphasis on teacher-centred, lecture-based, text book based instruction to student-centred, interactive learning environments. This suggests that teachers need to learn new skills and also need to become lifelong learners to keep up to date with new knowledge, pedagogical issues and technology. Therefore, designing and implementing successful ICT-enabled education programmes is key to educators being more dynamic in their teaching strategies in the classroom (UNESCO, 1998).

The government of the Republic of Trinidad and Tobago, People's Partnership, philosophy as outlined in its 2010 manifesto has stated, *"in order to be a competitive nation in the global knowledge economy we will link our diversification strategy to the creation of knowledge industries in order to create high-end jobs. This will be achieved by installing basic, technology-driven infrastructure so as to create the information superhighway to connect us locally, regionally and internationally."*

There are several challenges facing Trinidad and Tobago in becoming a knowledge based economy. There is a need for a cadre of skilled and competent professionals with good business ethics as productivity will be a key in the building process. There is also a need for an improved ICT infrastructure and legislative framework. Also the curriculum at the tertiary level needs to be infused with more ICTs and critical thinking so as to encourage innovation and meaningful transformation in the economy (Trinidad and Tobago Chamber of Industry and Commerce, 2010).

To accomplish the goal of transforming the traditional paradigm of learning in the classroom (teacher-centred, lecture-based, text book based instruction to student-centred, interactive learning environment (The 1998 UNESCO World Education Report, *Teachers and Teaching in a Changing World and the 2013 UNESCO Rethinking Education in a Changing World)* educators must have an implicit understanding of how the new technologies operate and further how they are to create and subsequently impact on existing learning environments. Students will have more responsibility thrust upon them with regards to their learning as well as the construction of their own knowledge. Technology, pedagogy and education seek to serve the international education community by supporting educators in the integration of ICT in teaching and learning.

2.2 OBJECTIVES

Tertiary educational institutions play a significant role in preparing their students to deal with issues surrounding the appropriate use of technology. This preparation is a key component of a 21st century education. Clear communicated policies, a curriculum that incorporates technology usage issues and modeling of ethical behavior should be key components of any educational institution’s effort to guide students through the complexities of the digital world (UNESCO, 1998).

This study was conducted in Trinidad and Tobago and sought to address the following issues.

To analyze how learning and teaching strategies have been influenced by ICT.

Literature looked at the traditional teaching methods and strategies employed at tertiary institutions. It will also review the introduction of ICT into the curriculum and how it has impacted on the teaching methods.

The literature also delved into how ICT has influenced the teaching methods in tertiary education with respect to the delivery of course content.

Literature also reviewed how educators are equipping themselves to keep up to date with technological advancement through legal and ethical issues in the classrooms.

It also sought to analyze case relevance between epistemology and pedagogy in tertiary education.

The literature reviewed the pedagogical as well as the epistemological issues related to the use of ICT in the application of the courses delivered in tertiary educational institutions.

It also looked at the pedagogical and epistemological relevance to tertiary education.

As a direct consequence of the aforementioned issues, the study also sought ***to analyze how to develop positive attitudes towards technology usage that support lifelong learning and collaboration amongst students.***

The literature also addressed a review of collaboration mechanism that could be utilized amongst students through the use of technology. The concept of lifelong learning was also reviewed with emphasis on the usage of ICT tools.

The literature discussed what the various attitudes needed to be developed if lifelong learning is to be achieved by students.

ICT has begun to have a presence within education however the impact has not been as extensive as in other fields. Education is a socially oriented activity and education has traditionally been associated with teachers having personal interaction with learners. The usage of ICT in education lends itself to more student-centred learning environment and more often than not creates tensions for some teachers and students. There is an intrinsic link between epistemology and education.

Teachers, like all other knowledge based workers, need to be self-regulated, and critically reflective lifelong learners. Therefore it is imperative to understand the “how” (processes) of learning as well as the “what” (content) (Klatter et al., 2001). A growing body of research is showing that teacher educators must focus on teacher beliefs about knowing and learning, that is, epistemological beliefs may provide valuable insights into how to improve teaching and learning in higher education (Beers, 1984; Hofer, 1994; Hofer and Pintrich, 1997; Schommer, 1990).

2.3 HISTORY OF ICT IN EDUCATION

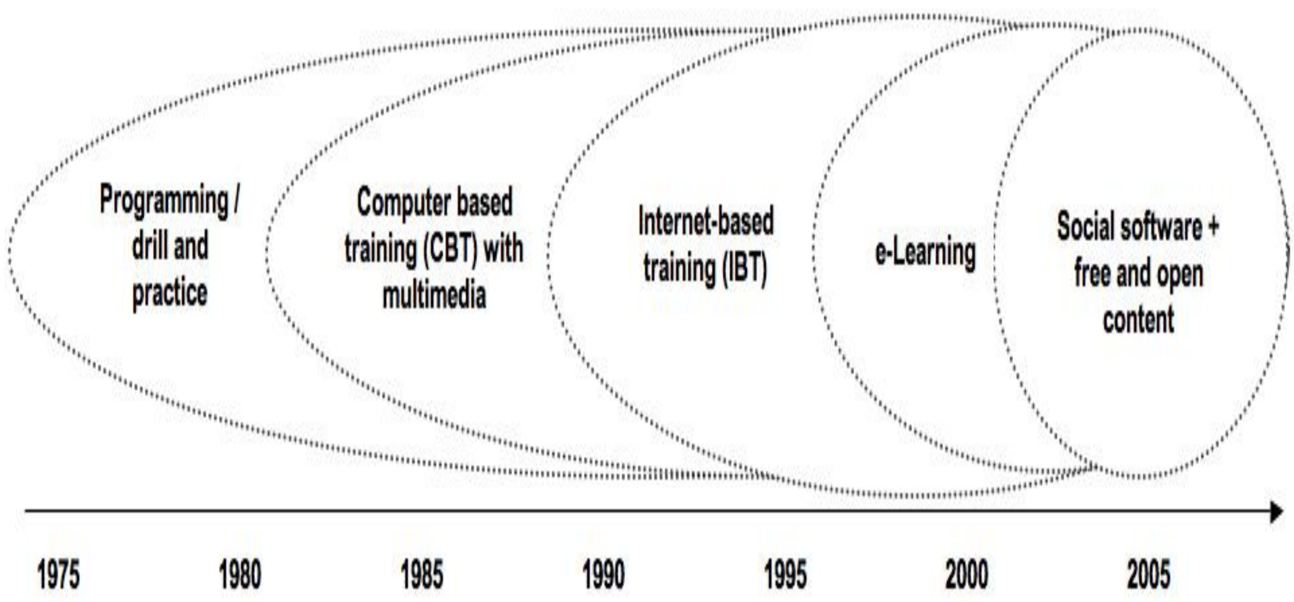


Fig 2.3: Conceptual Map of Progression of ICT in Education. Source : Leininen (2005)

According to Leinonen (2005) there are four major phases in history of using computers in education and the fifth phase: the era of the social software and free open content is emerging.

Phase 1: late 1970s to early 1980s – programming drill and practice

In this phase the pedagogical reason to teach programming was not to train students in programming but to help them develop logic and mathematical skills.

Phase 2: late 1980s to early 1990s – computer based training (CBT) with multi media

In this era it was said by many educators that students would learn if they could watch animations in colour, small video clips and then do the exercises. The pedagogical reason was that humans are different and as such some learners learn better by watching movies/animations/listening to audio clips whereas others learn better by reading or watching still images. The drill and practice component of phase1 were kept in the second phase but its role was more to control oneself if the student learned what the multimedia was trying to teach.

Phase 3: early 1900s- Internet based training (IBT)

The third phase came into existence with the advent of the World Wide Web. CBT was brought to the internet but without the multimedia. At that time, early 1990s, were text and pictures and some early experiments with animation, video and audio. It was realized that clicking and reading e-learning course materials online did not make people smart.

The educational idea behind internet-based learning was not pedagogical. The main purpose and reason to promote it was the belief that it was cost-effective as there were no more travelling to training or absenteeism from the workplace.

Phase 4: late 1900s to early 2000s – e-learning

The IBT matured in the late 1900s and early 2000 in the form of e-learning. The hype of e-learning is a classic example of creating needs. Thousands of websites, articles and companies made it very clear that for all who were related to education that this is something you must be involved in. The markets for e-learning and especially LMS (Learning Management Systems) were thus created.

The pedagogical thinking behind e-learning is similar to that of computer based learning. The point is to deliver courses to students. Later on, the learning platform developers have become more aware that learning requires social activities amongst the learners as well as amongst learners and teachers.

Phase 5: late 2000 – social software and free and open content

Blogs and wikis have brought the web back to its original idea-simple tool for personal notes that are easily accessible and even editable by your peers. The pedagogical thinking can be attributed to Vygotsky (1978) who wrote that 'all higher [mental] functions originate as actual relations between human individuals.'

2.4 LEARNING STYLES

Crotty (1981:8) explains that epistemology deals with *"the nature of knowledge, its possibility, scope and general basis"* (cited by Hamlyn1995). Crotty (1981:8) citing from Maynard (1994) explains the relevance of epistemology to what we are about here*: "epistemology is concerned with providing a philosophical grounding for deciding what kinds of knowledge are possible and how we can ensure that they are both adequate and legitimate".* Epistemological beliefs refer holistically to personally held beliefs about what knowledge is, how it can be gained, its degree of certainty and the limits and criteria for determining knowledge (Perry, 1970).

The seminal work of William Perry (1970) demonstrates a model of understanding how college students "come to know the theories and beliefs they hold about knowing and the manner in which such epistemological premises are part of and an influence on the cognitive processes of thinking and reasoning" (Hofer and Pintrich, 1997:88). Perry (1970) proposed college students pass through a predictable sequence of stages of epistemological growth.

Fundamental to Perry's Scheme is a student's nine-stage progression from dualist to relativist epistemologies. Learners progress from viewing truth in absolute terms of Right and Wrong (obtained from "Good" or "Bad" authorities) to recognizing multiple, conflicting versions of "truth" representing legitimate alternatives. The nine positions of Perry's Scheme can be categorized into four central positions as illustrated in Table 1.

Basic Dualist	• All questions are answered • All teachers know right answers and will teach them • Students must learn right answers
Full Dualist	• All questions have answers • Some teachers know right answers and teach them • Others don't, but teach them anyway • Student must know right answers and ignore all others
Early Multiplicity	• Some questions have known answers • Others have not-yet-known answers • Teachers know right ways to get answers • Students must learn how to find right answers
Late Multiplicity	• Most questions have no known answers • Teacher is the source of thinking process OR • Student must learn to think for self (everyone has right to own opinion) OR • Does not matter which answer you give

Table 2.19 : Overview of Four Central Perry Positions (Perry, 1970)

The way in which individuals approach a learning situation depends upon numerous factors. The primary factor amongst them is what psychologists describe as personality, this term, psychologists usually mean what makes one person different from another and what is especially important is how it influences the learning and consequently teaching styles in the classrooms.

A learning style is a student's consistent way of responding to and using stimuli in the context of learning. Keefe (1979) as cited by Clark (2012) defines learning styles as the *“composite of characteristic cognitive, affective, and physiological factors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment.”* Stewart and Felicetti (1992) as cited by Clark (2012) define learning styles as *those “educational conditions under which a student is most likely to learn.”* Thus, learning styles are not really concerned with *what* learners learn, but rather *how* they prefer to learn.

David Kolb, Professor of Organizational Behaviour at Case Western Reserve University, is credited with launching the learning styles movement in the early1970s and is perhaps one of the most influential learning models developed.

Kolb (1984:41) states that learning is *‘the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping experience and transforming it’*.

Kolb (1984) proposed that experiential learning has six main characteristics:

1. Learning is best conceived as a process, not in terms of outcomes.
2. Learning is a continuous process grounded in experience.
3. Learning requires the resolution of conflicts between dialectically opposed modes of adaptation to the world (learning is by its very nature full of tension).
4. Learning is a holistic process of adaptation to the world.
5. Learning involves transactions between the person and the environment.

6. Learning is the process of creating knowledge that is the result of the transaction between social knowledge and personal knowledge

Kolb's learning theory sets out four distinct learning styles, which are based on a four-stage learning cycle – ***doing, watching, thinking and feeling***. In this respect, Kolb's model differs from others since it offers both a way to understand individual learning styles, which he named the "Learning Styles Inventory" (LSI), and also an explanation of a cycle of *experiential learning* that applies to all learners. There are essentially two continuum.

- With the Processing Continuum: the approach to a task, such as preferring to learn by doing or watching and
- With the Perception Continuum: the emotional response, such as preferring to learn by thinking or feeling

Kolb (1984) provided a learning cycle that involves four processes that must be present for learning to take place which he referred to as *Experiential Learning*.

Each end of the continuum provides a step in the learning process:

- Concrete experience (feeling): Learning from specific experiences and relating to people. Sensitive to other's feelings.
- Reflective observation (watching): Observing before making a judgment by viewing the environment from different perspectives. Looks for the meaning of things.

- Abstract conceptualization (thinking): Logical analysis of ideas and acting on intellectual understanding of a situation.
- Active experimentation (doing): Ability to get things done by influencing people and events through action. Includes risk-taking.

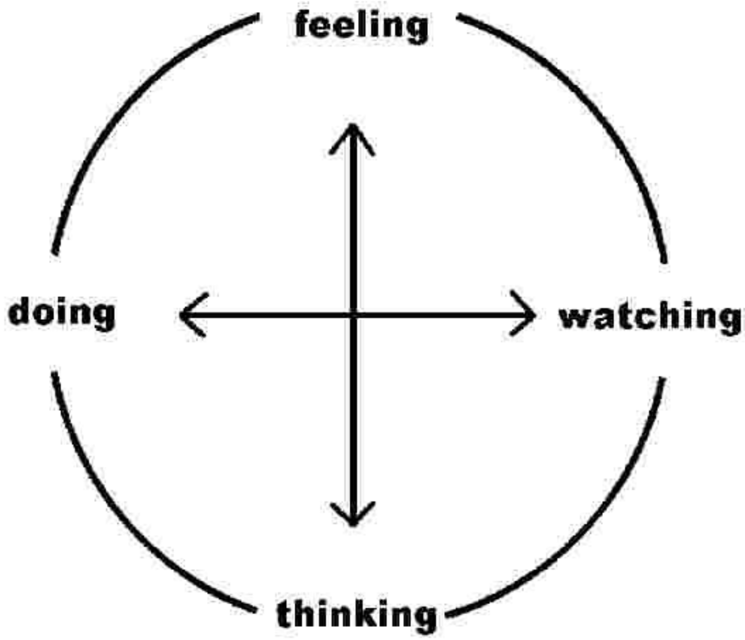


Fig 2.2: Kolb's two continuum by Kolb (1984)

Depending on the situation or the environment, the learners may enter the learning cycle at any point and will best learn the new task if they practice all four modes.

Kolb (1984) theorized that the four combinations of perceiving and processing determine one of the four learning styles (diverging, assimilating, converging and accommodating) of how people prefer to learn. Kolb (1984) believed that learning styles are not fixed personality traits, but relatively stable patterns of behaviour that is based on their background and experiences. Thus, they can be thought of more as learning preferences, rather than styles.

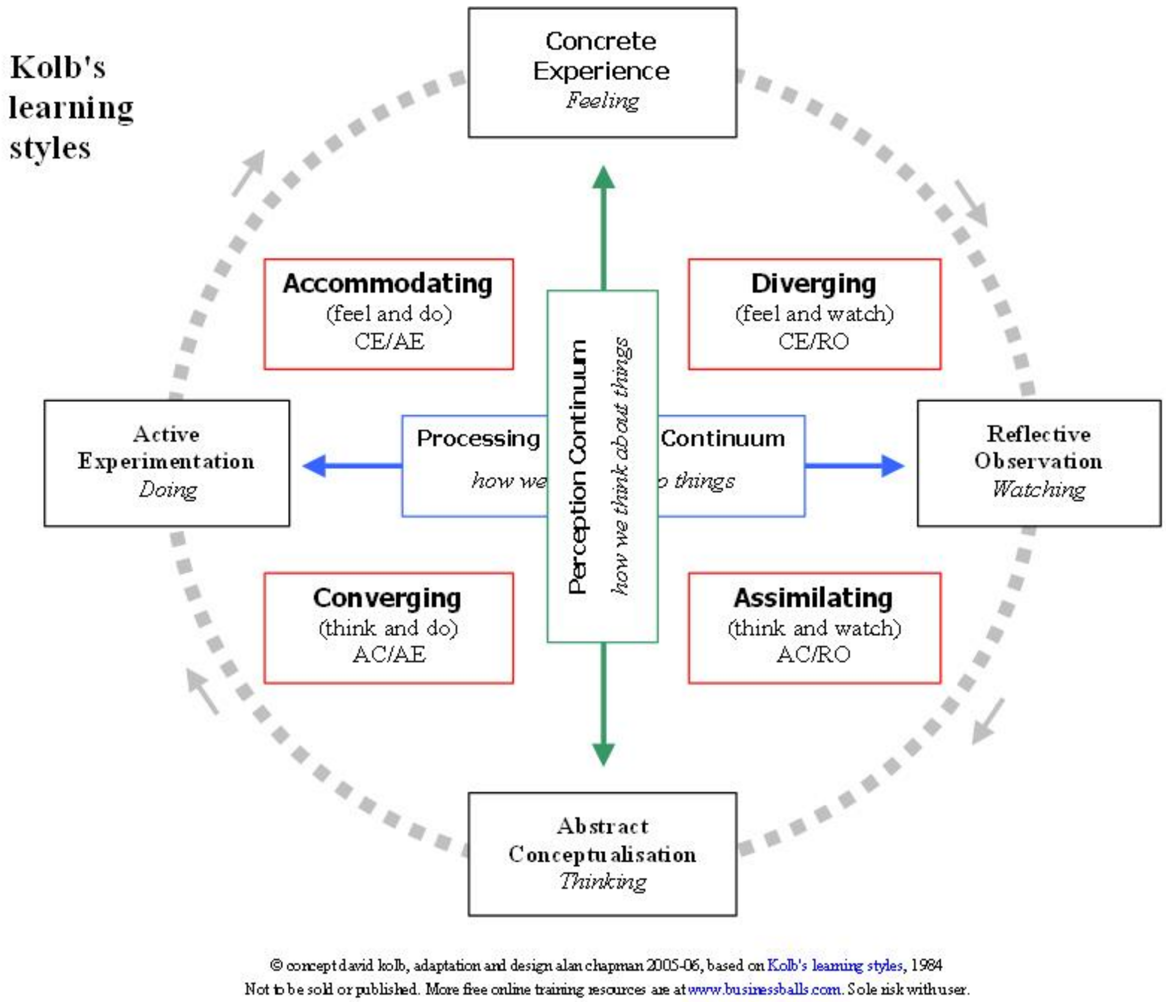


Fig 2.3: Kolb's Learning Styles. Source Kolb (1984)

The following table explains the characteristics of Kolb's four learning styles

Diverging (concrete, reflective)	Emphasizes the innovative and imaginative approach to doing things. Views concrete situations from many perspectives and adapts by observation rather than by action. Interested in people and tends to be feeling-oriented. Likes such activities as cooperative groups and brainstorming
Assimilating (abstract, reflective)	Pulls a number of different observations and thoughts into an integrated whole. Likes to reason inductively and create models and theories. Likes to design projects and experiments
Converging (abstract, active)	Emphasizes the practical application of ideas and solving problems. Likes decision-making, problem-solving, and the practical application of ideas. Prefers technical problems over interpersonal issues
Accommodating (concrete, active)	Uses trial and error rather than thought and reflection. Good at adapting to changing circumstances; solves problems in an intuitive, trial-and-error manner, such as discovery learning. Also tends to be at ease with people.

Table 20.2: Kolb's Learning Styles. Source: Kolb (1984)

The term learning styles is chiefly associated with Honey and Mumford (2000) who developed on some of Kolb (1984) ideas. They suggested that each individual has a predisposition to use a part of the learning cycle as the primary approach to learning.

Honey and Mumford (2000) hypothesized that people prefer different methods of learning, depending upon the situation and their experience level, thus they move between the four modes of learning, rather than being locked into one mode

Honey and Mumford's learning cycle also differs from Kolb (1984) in that they postulated that the learner may:

- Have an experience;
- Reflect on the experience;
- Draw one's own conclusions (theorizing);and
- Put the theory into practice to see what happens

Based on the result, the learners can then move around the cycle again, jump in at any part of the cycle and quit when they deem themselves as successful (learned the task or material). Their model is illustrated in the following figures.

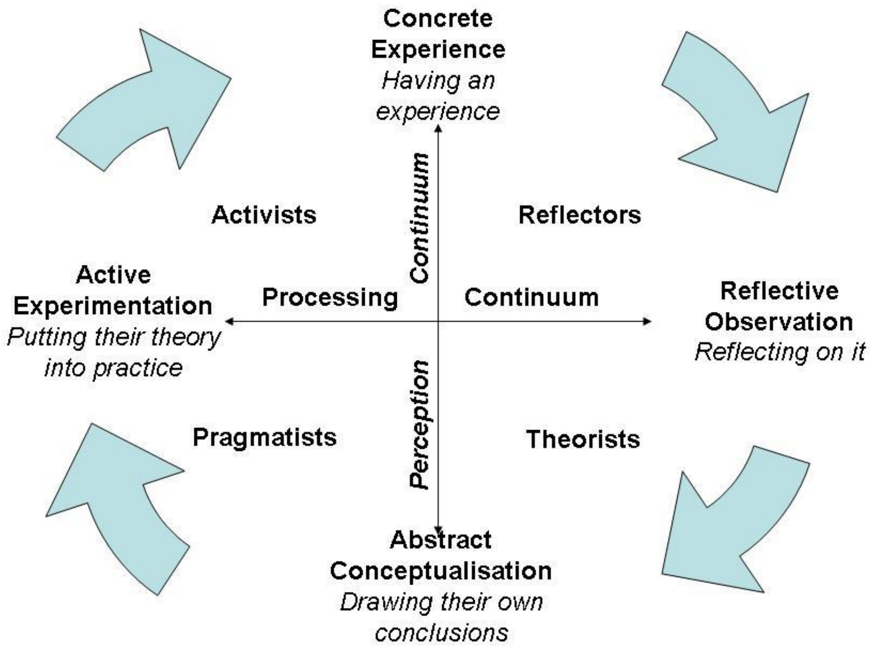


Fig 2.4: Learning Style. Source: Honey and Mumford (1992)

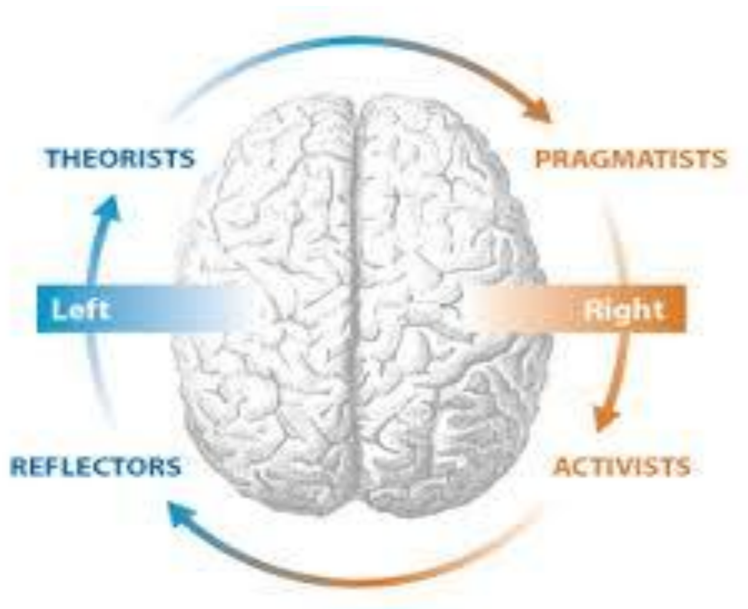


Fig2.5: The two continuum by Kolb (1984)

Honey and Mumford (2000) state that there are four types of learner – Reflector, Theorist, Pragmatist and Activist which correspond to the experiencing, reflecting, generalizing and testing stages of the cycle.

Honey and Mumford (2000) state that in learning situations the Reflector

Favours	***Find difficulty with***
Passive situations eg watching video	Inadequate information
Good briefing before participative activity	Time pressured activity
Time for preparation	Extrovert activities eg role-play
Lack of pressure or deadlines	Thinking 'on their feet'
Structured learning situations	'Cut and dried' instructions

Table 2.21: Reflector. Source: Honey and Mumford (2000)

The Theorist

Favours	***Find difficulty with***
Learning set in a conceptual framework	Learning situations emphasizing emotions and feelings
Structured situations with a clear purpose	Overviews without tackling anything in depth
Listening to, or reading about, well-argued, logical ideas	Situations with no apparent context or an ambiguous one
Being intellectually stretched	Ideas that have not been subject to

	detailed scrutiny
Interesting notions even if they are not immediately relevant	Mixing with others with different learning styles
Understanding and participating in highly complex situations	Open-ended problems and uncertain situations
Being able to question and probe assumptions, models and logic	

Table 2.22: Theorist. Source: Honey and Mumford (2000)

On the other hand, the Pragmatist

Favours	***Find difficulty with***
Obvious links between theory and practice	'Chalk and talk'
Skills and techniques with obvious practical advantages for example time management	Lack of guidelines or clear practice
Working with a credible expert	Discussion without any clear end point
Demonstrations, simulations, films with a practical bias	Ideas that seem distant from reality, too 'ivory-towered
Working with real problems, realistic case studies	Concepts that they will not be able to practice
Knowledge with immediate and obvious application	

Action plans	

Table 2.23: Pragmatist. Source: Honey and Mumford (2000)

And lastly the Activist

Favours	***Find difficulty with***
Teamwork, games and simulations, role-plays	Passive learning e,g. listening to lectures
Brainstorming, unstructured discussions	Solitary activities
A range of diverse activities	Repetition
Project work	Concepts not anchored to practice
Creative situations	Detail
Problem-based learning	Rigidly following instructions
Extrovert activities such as giving presentations	

Table 2.24: Activist. Source: Honey and Mumford (2000)

Students inherently decide to do or to watch and also whether to think or to feel. The result of these two decisions produces and ultimately helps to form throughout the life span of the learner, the preferred learning style. The student may inevitably choose a way of ‘grasping the experience’ which defines the approach of the task at hand, or the student may choose a way to ‘transform the experience’ into something that is meaningful as well as usable, in essence, something that defines the emotional response to a given experience. Therefore, according to Kolb (1984) the learning style of an individual is the result of the decision of the two choices:

1. how to approach a task - ‘grasping experience’ – that is, preferring to either (a) watch or (b) do; and
2. the emotional response to the experience – ‘transforming the experience’ –that is, preferring to (a) think or (b) feel.

Kolb (1984) further explained that if a student chooses the approach to the task or experience by opting for 1(a) or 1(b); this means that:

1(a) - through ‘jumping straight in’ and just doing (‘active experimentation’ or ‘doing’) whilst with

1(b) - through watching others involved and then reflecting on what happens (‘reflective observation; or ‘watching’).

And at the same time, the student chooses how to transform the experience emotionally into something meaningful by choosing either 2(a) or 2(b), this means if chosen

2(a) – through gaining new information by thinking, analyzing or planning (‘abstract conceptualization’ or ‘thinking’) or

2(b) – through experiencing the ‘concrete, tangible qualities of the world’ (‘concrete experience’ or ‘feeling’)

The combination of these two choices of 1 gives rise to the learning style of the student.

Grasha (1996) describes six types of learning styles that he and Sheryl Riechman have used as the basis for their student learning styles scale which look at the competitive student, the collaborative student, the avoidant student, the participant student, the dependent student and lastly the independent student.

Grasha (1996) explains that the competitive student learns the material so as to perform better than others. This student style likes to receive the recognition for his accomplishments and always prefer teacher-centred instructions as well as group tasks where the student prefers to lead and demonstrates his pre-eminence.

The second learning style, the collaborative student, Grasha (1996) indicates that this type of student can learn by sharing ideas and talents. This student likes to cooperate with the teacher and also likes to work with other students which eventually lead to an overall preference for group work, projects, seminars and lectures where there is a predominance of small group discussion.

The avoidant student – the third of the six styles- this type of student Grasha (1996) explains is uninterested in classroom learning and usually is a reluctant participant in classroom learning. In this style, the student prefers large groups as they can remain anonymous. Grasha (1996) states that the avoidant student does not appreciate enthusiastic teachers.

The participant student enjoys participating in the classroom. This type of learning style, the student is eager to embrace all options available in order to meet all requirements. Grasha (1996) describes that this student prefers participative exercises which include lectures allowing student involvement, informal discussions and reading assignments.

The dependent student demonstrates little intellectual curiosity and learns only what absolutely required states Grasha (1996) is. This fifth learning style, the student looks for structure and specifics and prefers teacher –centred classroom situation, handouts or detailed notes available for copying and clear deadlines and instructions for all assignments.

The final learning style, the independent student, likes to think for himself and is confident in his abilities states Grasha (1996). He often works alone and usually prefers student-centred methods, self-paced instructions and prefers to think independently.

2.5 TEACHING STYLES

Grasha (1996) describes five teaching styles:

The ***Expert*** *p*ossesses knowledge and expertise in the subject; concerned with transmitting information; strives to demonstrate expertise to students and thus maintain his own status; while the ***Formal Authority*** possesses status because of the role as a teacher; he is concerned with the correct, acceptable and standard ways of doing things and with providing feedback, both negative and positive and he is likely to establish learning goals, expectations and rules of conduct. The ***Personal*** *Model* believes in teaching by personal example; oversees, guides and directs by showing how to do things and encouraging students to observe and emulate; whilst the ***Facilitator*** guides, supports and encourages students to develop themselves; encourages asking questions and exploring options; develops initiative and responsibility; works with students on projects in a consultative fashion; and the ***Delegator*** perceives the role as a resource to be called upon by students; expects students to work autonomously and independently.

Harb et al (1995) identify four teaching roles: the ***Motivator*** introduces the subject, provides the big picture, provides meaning, generates enthusiasm and shows respect and interest; whilst the ***Expert*** provides information to the student, organizes and integrates new material and provides time for thinking and reflection; the ***Coach*** provides opportunities for students to apply the material, helps students to develop problem-solving patterns and establishes a safe learning environment for experimentation; and the ***Evaluator*** provides opportunity for self-discovery provides opportunities for students to share discoveries and evaluates performance.

Harb et al (1995) rationalizes that the **Motivator** moves the student on from Experience to Reflection, the **Expert** from Reflection to Conceptualization, the **Coach** from Conceptualization to Application and the **Evaluator** from Application to Experience.

Universities are extensively knowledge-rich in principle and faculty members' work is related to knowledge. Therefore, it is possible that any change in faculty workplace depend on simultaneous changes in teachers' epistemological beliefs. Teachers who are aware and "believe" that the nature of knowledge changes with the emergence of ICTs are more probable to be involved in change than teachers who resist changing their epistemological beliefs altogether.

According to Valimaa et al (2006:167) this is not true only for the introduction of ICT, it holds as well for implementation of teaching and learning. The effect will increase substantially if new educational paradigms emerge simultaneously with new ICT.

Revising the personal epistemology of teachers is far from trivial. It is suggested by Valimaa et al (2006:167) that one reason is that academic staff members have to undergo changes that emerge from outside their own domain. They may even undergo a change in their epistemological beliefs (e.g. from “scientific knowledge is truth” to “scientific truth is agreement within a community”) undermines the worth of their domain of knowledge.

Evidence shows that epistemological beliefs have a great impact on learning outcomes for both teachers and students simply because they influence learning strategies and the depth of information processing.

Students’ orientation in a “world of learning and knowledge” depends on what is presented to them by their teachers. Whatever approach is used, it is what the student does is what is important. The teacher is only the facilitator – a person who enables learning activities and assists students to achieve the desired outcomes (Biggs 1999). Biggs calls learning designed to achieve the desired teacher and student goals a type of entrapment in a “web of constituency that optimizes the likelihood that students will become engaged in appropriate learning activities (Biggs 1999). Therefore, the teachers’ personal epistemological beliefs play a critical role. This “two-fold role of epistemological beliefs” is a crucial factor for the successful implementation of ICT (e-learning environments, multimedia learning environments) for faculty development (Valimaa et al, 2006:167).

Salomon (2000) notes *“Education is far too important to society to be wiggled by a technological list. Let technology show us what can be done, and let educational considerations determine what will be done in actuality”*. There is an urgent need to re-conceptualize the educational curriculum and re-evaluate teaching and learning models within the technological environment (Monahan, 2005, Triggs and John, 2004, Greene, 1971 as cited by Juang Wang, 2008).

Research has shown that the quality of learning can be significantly enhanced when ICTs are approached and utilized to promote dynamic, interactive thinking (Karakaya and Senyapth, 2007; Hirschheim, 2005 as cited by Juang Wang, 2008). ICTs can enhance critical thinking, information handling skills, high-level conceptualization and problem solving. Since many new technologies are interactive they are already being used extensively to create and sustain a wide range of collaborative processes and activity.

Porter (1991) as cited in Rumpagarorn (2007) indicated that students brought with them their own set of knowledge content, a variety of thinking skills and their attitudes towards critical thinking into the classroom environment. Their characteristics were subsequently modified through learning activities and their personal experiences, students’ practices and pedagogy and curriculum. He further concluded that the final product was the students’ outcomes, one of which could be the critical thinking skill.

2.6 CRITICAL THINKING SKILLS

Critical thinking has been a focus of educational reform movements throughout educational history. Ennis (1985) has defined critical thinking as comprising of three essential components. The first component is a problem-solving process in a context of interacting with the world and others. The second component is a reasoning process, informed by the background knowledge and previously acceptable conclusions which resulted in drawing a number of inferences through induction, deduction and valued judgment. The third component is a decision about what to do or what to believe. Consequently, it should be noted from Ennis's approach that critical thinking involves general critical thinking but also dispositions towards critical thinking and a decision on how to act.

Critical thinking, according to Paul and Willsen (1995), was a purposeful and systematic method of thought. They further explained that the critical thinking skills involved a highly systematic process whereby there was clear support for reasoning, precision and awareness of thought. The authors also suggested that if educational institutions were interested in the education of their students then they needed to examine the ways in which they conceptualized critical thinking skills.

Yet another definition suggested by educators in the psychological field is that of Lipman (1995:146) which states that *'critical thinking is skillful, responsible thinking that facilitates good judgments because it (1) relies upon criteria, (2) is self-correcting and(3) is sensitive to context'.* Lipman integrates the concepts of standards (evaluation criteria), skills (particularly cognitive skills) and personal judgments into education.

Research in classroom learning environment has emphasized the opportunities gained. Ramirez and Bell (1994:26) have identified two important factors:

1. *Interaction rather than isolation*. Knowledge and expertise were developed when students had an opportunity to interact with resources inclusive of teachers, peers, experts, print and electronic text and databases
2. *Cognitive research*. Students learned best when the tasks involved meaningful contexts, activities and problems so that they can actively construct their own knowledge and develop the ability to apply what they learned to new situations.

Facione, Facione and Sancez (1994:28) observed that:

> *'Educating good critical thinkers is more important than developing critical thinking skills. A complete approach to developing good critical thinkers includes nurturing the disposition toward critical thinking, an effort integral to insuring the use of critical thinking skills outside the narrow instructional setting.'*

2.7 PEDAGOGY

The most important aspect of infusing technology into the curriculum is pedagogy. Pedagogy has been defined by the Journal of the Association of Information Technology (JAIF) in Teacher Education as the art or profession of teaching; the activities of educating or instructing or teaching; principles and methods of instruction. The Journal of the Association Technology in Teacher Education explains that technology, pedagogy and education seek to serve the international education community by supporting educators in the integration of ICT in teaching and learning.

When implementing the pedagogical competencies for infusing technology, the local context as well as the individual approach of the teacher linked with the subject discipline must be paramount. According to A Planning Guide in Teacher Education UNESCO (2002), Teachers move through stages as they adopt ICTs. Initially, the teacher adopting technology applies it simply as a substitute for current teaching practice where technology is not used (for example, teacher's lecture becomes an electronic presentation supporting lecture, students writing papers by hand become students writing papers utilizing word processing packages). The adaptation of ICTs as stated by UNESCO, by teachers should challenge and support changes in teaching practice, building upon teachers' personal pedagogic expertise.

As teachers' pedagogical practices with new ICTs continue to develop, and original support and access to ICTs grow, it then becomes possible to move beyond the adaptation of ICT applications that fit with existing practice.

As professional teachers, educators continually develop their pedagogical use of ICTs to support learning, teaching and curriculum development, including assessment of learners and evaluation of teaching, they will:

(i) Demonstrate understanding of the opportunities and implications of the uses of ICTs for learning and teaching in curriculum development;

(ii) Plan, implement and manage learning and teaching in open and flexible learning environments; and

(iii) Assess and evaluate learning and teaching in open and flexible learning environments.

Educational systems around the world are under increasing pressure to use ICTs to teach students the knowledge and skills they require in the 21st century. The 1998 and 2013 UNESCO World Education Report, Teachers and Teaching in a changing world, predicted the transformation of the teaching-learning process and the way teachers and learners gain access to knowledge and information. With emerging new technologies, the teaching profession is evolving from an emphasis on teacher-centred, lecture-based instruction to student-centred, interactive learning environment.

Designing and implementing successful ICT-enabled teacher education programmes is in fact the key to fundamental, wide ranging educational reform.

According to some schools of thoughts, there are two types of pedagogy, instruction and construction. The Instruction approach is the traditional process of teaching which has revolved around teachers planning and leading students through a series of instructional sequences to achieve a desired learning outcome. The Construction approach refers to a way of teaching that demands a redefinition of the traditional teacher-student relationship. Contemporary learning theory is based on the notion that learning is an active process of constructing knowledge rather than acquiring knowledge and that instruction is the process by which this knowledge construction is supported rather than a process of knowledge transmission (Duffy & Cunningham, 1996 as cited in

Oliver 2002). In constructivist theories, social interactions are seen to play a critical role in the processes of learning and cognition (Vygotsky, 1978). The use of ICTs can contribute to a movement towards Constructive Teaching approaches, and this can subsequently lead to greater use of ICT in education (UNESCO, 2002) as illustrated in the following Table.

	Instruction	**Construction**
Classroom Activity	Teacher-centred; Didactic	Learner-Centred; Interactive
Teacher Role	Fact Teller; Always expert	Collaborator; Sometimes expert
Student Role	Listener; Always learner	Collaborator; Sometimes expert
Instructional emphasis	Facts; Memorization	Relationships; Inquiry and Invention
Concept of knowledge	Accumulation of facts	Transformation of facts
Demonstration of success	Quantity	Quality of understanding
Technology use	Drill and practice	Communication, Collaboration, Information access, expression

Table 2.25: Comparison of Instruction and Construction teaching approaches

(Source: UNESCO, 2002)

Cox et al (1999) note that pedagogy of ICT should be understood within the broader framework of educational practice. What is observed in the classroom is only part of the practice. Therefore Cox et al (1999) continues to add that illuminating good practice in teaching and learning with ICT will require examining teachers' ideas, values, beliefs and thinking that lead to observable elements in practice.

Giroux (1988) states that

> *"we must get away from training teachers to simply be efficient technicians and practitioners. We need a new vision that constitutes educational leadership so that we can educate teachers to think critically, locate themselves in their own histories and exercise moral and public responsibility in their role as engaged critics and transformative intellectuals".*

UNESCO (2002) has identified that teachers' pedagogical approaches are affected by various factors. Firstly, they are affected by knowledge about their own subject. There is a clear distinction between teachers choosing ICT and resources to fit within a particular topic area and those who choose resources merely to present students' work in a new way without any application to the topic area under consideration. It should be noted that when teachers use their knowledge both of the subject and also of how their students understand the topic area, their use of ICT has a more direct effect on their students understanding.

UNESCO (2004) has identified three main approaches to ICT taken by teachers:

- *Integrated Approach* - planning the use of ICT within the subject to enhance particular concepts and skills and improve students' attainment.
- *Enhancement Approach* - planning the use of ICT resource which will enhance the existing topic through some aspect of the lessons and tasks. For example, using an electronic whiteboard for the presentation of the theory

about the topic. Using this approach, the teacher will complement the lesson with an innovative presentation method to promote class discussion / interaction and visualization of problems.

- *Complementary Approach* - using an ICT resource to empower the students' learning, for example, by enabling them to improve their class work by taking notes on the computer, or by sending homework by email to the teacher or by word processing their homework.

All three approaches can in fact enhance attainment, but their effects may be different. In the Integrated Approach, students' learning is enhanced because they are confronted with challenges to their existing knowledge and given deeper insights into the subject area being studied.

In the Enhancement Approach, students could improve their learning through presenting knowledge in new ways, promoting discussions/debates amongst students and encouraging them to formulate their own opinions.

The Complementary Approach suggests that learning can be enhanced by reducing the mundane and repetitive aspects of tasks such as writing essays and homework by hand, freeing the student to focus on more challenging and subject-focused tasks.

The three different types of use explained previously require the teacher to have an extensive knowledge of ICTs and to be able to fit its use either into their existing pedagogy or to extend their pedagogical knowledge so as to accommodate ICT effectively into their teaching.

Hennessy et al (2010) indicated that the impact on pedagogy can be summarized as being strategies that are:

- more learner-centred,
- more cooperative and collaborative,
- more active learning, and
- based on greater access to information and sources of information.

These impacts on pedagogy relate directly to the impacts on teachers, in particular the roles they play, their use of information, and their workload.

2.8 TEACHERS' INTEGRATION OF ICT INTO TEACHING AND LEARNING PROCESSES IN THE CLASSROOM

UNESCO (2004) classifies ICT in education into three broad categories: *pedagogy, training, and continuing education*. Pedagogy is focused on the effective learning of subjects with the support of the various components of ICT. Olakulehin (2007) emphasizes that the pedagogic application of ICT involves effective learning with the aid of computers and other information technologies as learning aids, which play complementary roles in the classroom, rather than supplementing the teacher.

Research and active projects, such as those run by EdQual, a Research Consortium of educational institutions in the UK and Africa (Ghana, Rwanda, South Africa, Tanzania) on Educational Quality, typically indicate two main reasons why teachers use ICT:

1. teachers feel that their own use of computers benefits their learners, and
2. teachers feel learners benefit from using computers themselves; they gain confidence, self-esteem and renewed motivation.

A report on ICT in Schools Research and Evaluation Series commissioned by UNESCO in 2002 identified a distinct correlation between ICT and pedagogy. ICT can be used effectively and has an impact on learning where teachers are able to appreciate that interactivity requires a new approach to pedagogy. Progressive educators are in fact employing problem-posing methods. *'In problem-posing education, people develop their power to perceive critically the way they exist in the world with which and in which they find themselves; they come to see the world not as a static reality, but as a reality in process in transformation*' as Freire (1970:83) noted in his book Pedagogy of the Oppressed.

Teachers, however, need to employ new proactive and responsive strategies in order to support, guide and facilitate learning. They must monitor progress and maintain focus on subject learning by structuring activities and providing focus groups.

As Giroux(1988) noted *"Teachers should construct curricula that draw upon the cultural resources that students bring with them to school suggests not only taking the languages, histories, experiences and voices of the students seriously, but also integrating what is taught in schools to the dynamics of everyday life".*

The role of the teacher has changed and continues to change from being an instructor to becoming a constructor, facilitator, coach and creator of learning environments.

- ICTs will cause certain teaching resources to become obsolete. Overhead projectors and chalkboard may no longer be a necessity if all students have access to the same networked resources on which the teacher is presenting, especially if students are not in the same place physically.
- ICT may also cause some assessment methods to become redundant, for example online tests; provide the teacher with more information than multiple choice tests.

It is no longer sufficient for teachers to impart content knowledge, but must encourage higher levels of cognitive skills, promote information literacy and nurture collaborative working practices. All of these are, in fact, facilitated by the use of ICTs in teaching. The report titled "A shift in pedagogy and integrating ICT in Education" in 2004 states today's teachers are required to be:

- Facilitators helping learners to make judgments about the quality and validity of new sources and knowledge;
- Open-minded and critical independent professionals;
- Active cooperators and collaborators;
- Mediators between learners and what they need to know; and
- Providers to scaffold understanding.

In order to enhance the learning process in the classroom, technology should be harnessed to support the students' learning processes. Morgan (1996) explained what was required of teachers. After having identified the concepts that students required to learn and the links to what students already knew, then it was time to consider how technology could be used to enhance the classroom learning environment.

For teachers to be able to integrate the use of ICTs into teaching, new competencies must be acquired which should include: creativity, flexibility, logistic skills for assigning work and study places and grouping students, skills for project work, administrative and organizational skills and collaborating skills.

To better achieve this, teachers need new pedagogical skills in order to take full advantage of the potential of technology to enhance student learning.

Teachers are no longer dispensers of knowledge but instead proactive facilitators who promote collaborative knowledge building and guide students to learn in various environments; to navigate within and process a multitude of information resource and to more importantly use these resources in solving problems and making decisions on their own (UNESCO, 2002).

Haddad and Draxler (2002) categorise the technology use in a classroom into five levels: presentation, demonstration, drill and practice, interaction and collaboration. Building on this, Thijs et al. (2001) argue that technology use creates a learner-centred environment by:

- Motivating learners by combining text, sound, colour and moving images that enhance content for easier learning;

- Facilitating acquisition of basic skills through drill and practice (not very learner-centred sounding though). This is better accomplished by education television broadcasts that teach literacy and numeracy at basic education level;
- Enhancing teacher training by improving access to and the quality of teacher training.

Today's university students will be the backbone of tomorrow's society and university education should be committed to seeking knowledge, fostering creative understanding and nurturing the whole personality.

Students should leave the university with a sense of ethical responsibility as well as aesthetic and qualitative standards they will need to contribute to society and enjoy meaningful lives. In short, education should be an agent for social change and growth (Juang Wang, 2008). In essence, using critical pedagogy to consider how education can provide individuals with the tools to better themselves and strengthen democracy, to create a more egalitarian and just society and thus deploy education in a process of progressive social change (Kellner, 2000).

Teaching and learning activities are intrinsically intertwined with collaboration (Juang Wang, 2008). Teaching involves multiple types of knowledge transformation that separate into different domains such as cognition, cooperation, coordination and collaboration. Learning involves measurable, transferable skills that underlie performance across a spectrum of disciplines (Dewey, 1966).

There is a growing tendency to stimulate students to learn actively, independently, in a self-directed way and in collaboration with others.

The integration of ICT into teaching and learning always places pedagogy over technology. It is not the only concern to master ICT skills, but rather it involves using ICT to improve teaching and learning. The major emphasis of ICT infusion in pedagogy should be that it tends to improve learning, motivate and engage learners, promote collaboration, foster enquiry and exploration, and create a new learner centred learning culture. It permits the move from reproductive model of teaching and learning to an independent, autonomous learning model that promotes initiation, creativity and critical thinking with independent research. Learners are expected to collect, select, analyze, organize, extend, transform and present knowledge using ICT in an authentic and active learning paradigm. Teachers, on the other hand, are expected to create new, flexible and open learning environment with interactive, experiential and multimedia based delivery system. ICT should help teachers and learners to communicate and collaborate without boundaries, make learners autonomous and allow teachers to bring the whole world into classroom activities Majumdar (2006).

Teachers are expected to upgrade their knowledge and acquire new skills in terms of pedagogical improvement. Communication is fundamental to collaboration (Debevec and Shih, 2006) which involves compromising (Kvan, 2000) or, students have to coordinate their learning activities with the social processes of collaboration. They have to create and maintain a positive collaborative climate in which they feel safe to contribute and can take responsibility for shared tasks (Juang Wang, 2008).

ICT provides powerful tools to support communication between learning groups and beyond classrooms. The teacher's role now expands to that of being a facilitator of collaboration and networking with local as well as global communities.

The expansion of the learning community beyond the classroom introduces attention to diversity and equitable access to electronic learning resources.

Students are beginning to appreciate the capability to undertake education anywhere, anytime and anyplace. This in turn has heightened the availability of just-in-time learning and provided learning opportunities for many more learners who would have previously been constrained (Young, 2002).

- Through on line technologies learning has become an activity that is no longer set within programmed schedules.
- The wide variety of ICTs supporting learning is able to provide asynchronous support for learning so that the need for real-time participation can be minimized while the advantages of communication and collaboration are maintained.
- Teachers are also finding the capabilities of teaching at any time to be opportunistic. Mobile technologies and seamless communication technologies support 24 x 7 teaching and learning (Young 2002).

Research has shown that the quality of learning can be significantly enhanced when ICTs are approached and utilized to promote dynamic, interactive thinking (Karakaya and Senyapth, 2007; Hirschheim, 2005 as cited by Juang Wang, 2008).

ICTs can enhance critical thinking, information handling skills, high-level conceptualization and problem solving. Since many new technologies are interactive they are already being used extensively to create and sustain a wide range of collaborative processes and activity.

ICT can help in overcoming two main issues of learning: “isolation and abstraction” (Visions 2020: Chen and Arnold. Punie, Zinnbauer and Carbrera (2006) have indicated that in a decade or two, three complementary interfaces will shape how people learn:

1. The “*world of the desktop*” interface will provide immediate access to experts hence enabling collaboration, mentoring relationships as well as access to varied virtual communities
2. Interfaces for “*ubiquitous computing*” whereby portable wireless devices will give easy access to virtual resources
3. The early stages of “*augmented reality*” interfaces are characterized by research on the role of “smart objects” and “intelligent contexts” in learning.

All these tools will be used in an appropriately adapted learning style context. A key objective of learning will be to obtain and create knowledge at the right time, in the right place, in the right way on the right device and available for all (Punie, Zinnbauer and Carbrera (2006)).

2.9 LIFELONG LEARNING

Such a changing educational landscape demands that teachers are expected to be life-long, autonomous and self-regulated learners with an ability to adapt readily to changing circumstances (Fallan, 2007; Triggs and John, 2004; McCormick and Scrimshow, 2001 as cited by Juang Wong 2008). Lifelong Learning has been defined by the European Commission as *“all learning activity undertaken throughout life, with the aim of improving knowledge, skills and competence within a personal, civic social and/or employment-related perspective”.*

The power to access information and communication technologies brings increased responsibilities to everyone, in particular, students and educators. Legal and moral codes need to be extended to respect intellectual property of freely accessible information. The challenges faced by society- locally, regionally and internationally- by adopting technology should become part of the curriculum in such a way that students develop a positive attitude towards the usage of ICTs and consequently be able to engage in debates surrounding ICTs. On the other hand, educators must also be cognizant of the social and health issues surrounding ICTs and subsequently apply their understanding to teaching practices.

UNESCO (2002) has emphasized that educators need to:

i. Understand and apply legal and moral codes of practice including copyright and intellectual property;
ii. Reflect upon and lead discussions of the impact of new technology on society; and
iii. Plan and promote healthy ergonomic use of ICTs

2.10 CONCEPTUAL FRAMEWORK

The refined conceptual framework as depicted in the following diagram illustrates the delivery of tertiary education through the use of ICTs can be categorized into pedagogy and epistemology. Pedagogy takes into consideration both teaching and learning which in turn is intrinsically intertwined with ICT whilst epistemology investigates the learning styles of the students as well as their critical thinking skills. Direct output from both epistemology and pedagogy is the lifelong learning

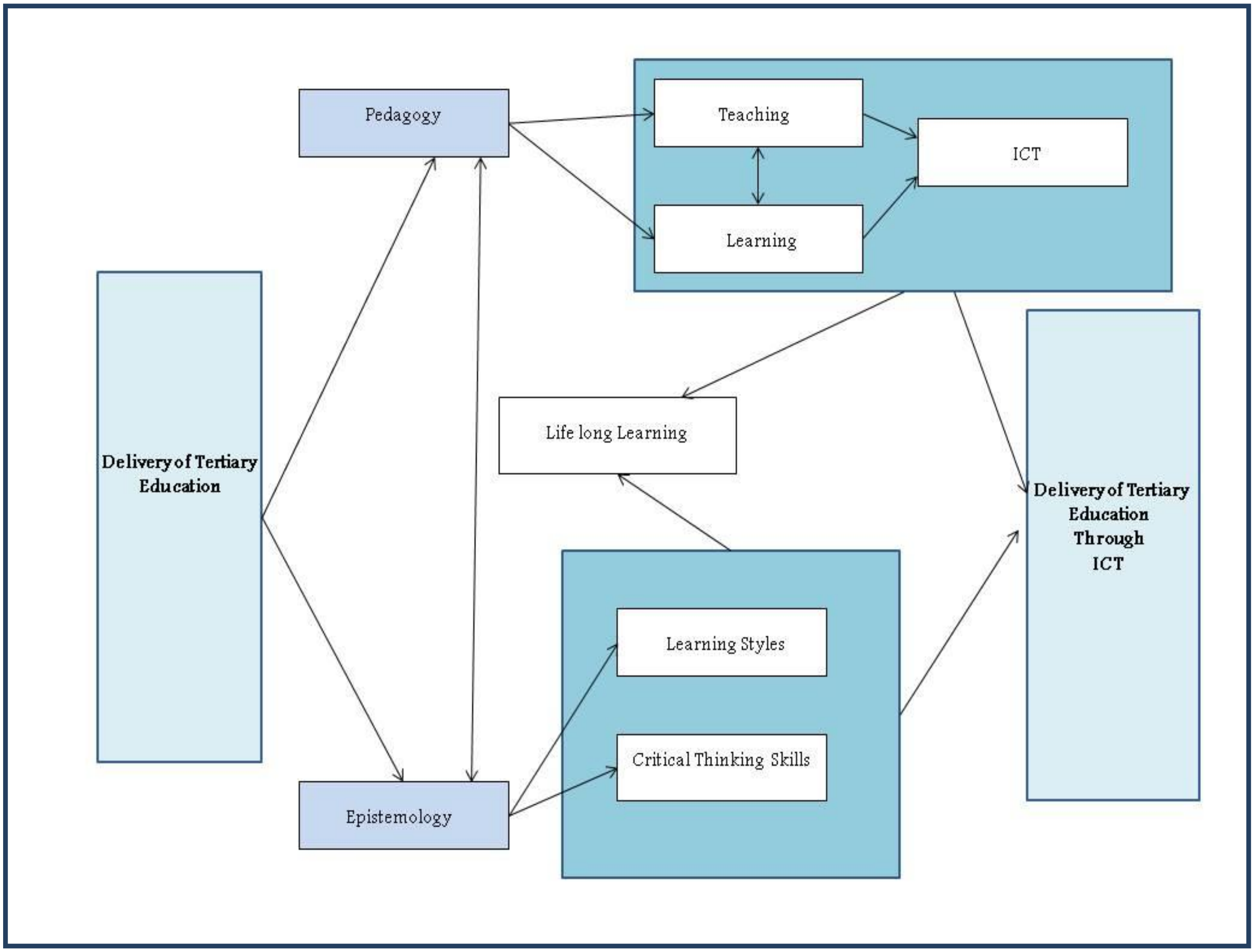


Fig 2.6: Conceptual Framework

2.11 GAP ANALYSIS

The literature in this paper has looked at an in-depth discussion about pedagogical and epistemological issues with respect to ICTs in teaching and learning in tertiary educational institutions in developed status countries whereby the formulation of the framework utilized many years of experienced resources and time in order to develop protocols and procedures necessary for the proper implementation and consequently suitable development in these countries.

However, in Trinidad and Tobago, where this research is being conducted, first and foremost, Trinidad and Tobago, a developing nation will not share the same perspective as that of the developed nations discussed in this literature review. In fact, no such study as being attempted has been conducted to date in Trinidad and Tobago.

In the National Agenda for Trinidad and Tobago – UNDP Workshop on Trinidad and Tobago Country Strategy Action Plan 2012 – 2015 held on August 2, 2011 seven interconnected pillars for a sustainable framework were outlined that will propel the country's development. One of the seven pillars was identified as people centred development which focuses on improving the education system and maintaining a seamless link for continuous learning. Yet another pillar looked at was information and communication technologies which will serve as a backbone to support the educated population, maintain effective communication locally and globally and promote timely information sharing and management. It can be seen that there is a distinct interconnection between education and information and communication technologies at the governmental strategic level.

In the context of the framework for sustainable development, the government recognizes the importance of tertiary education and lifelong learning which will play a vital role in social, economic and cultural development of Trinidad and Tobago. However, this is still at the strategic level in that it is outlined in the seven interconnected pillars for sustainable development (The Country Strategy Plan, 2012-2015).

Further to the Country Strategy Plan 2012-2015, the Policy of Tertiary Education, TVET and Training and Lifelong Learning in Trinidad and Tobago, October 2010 whereby a comprehensive set of initiatives have been outlined for the advancement of tertiary education and lifelong learning in Trinidad and Tobago. This policy has recognized that teachers at tertiary level will need to develop their pedagogical and related skills. There is also a need for technological re-skilling to prepare teachers to function effectively in modern, technologically-advanced learning environment.

One of the goals outlined in the Policy of Tertiary Education, TVET and Training and Lifelong Learning in Trinidad and Tobago (2010) is to produce graduates with the general education skills and competencies which will serve as the foundation for lifelong learning, including critical, analytical, problem solving and communication skills and also the ability to contribute to community-based development and nation building.

2.12 MODEL CHOSEN

This case study looked at the universities in the western Himalayan region in India. A framework was developed for assessing the initiative, status and performance and impact in the field of ICT in different universities and higher technical institution.

The framework is a four tier one where:

- **Tier I** is concerned with the vision and planning;
- **Tier II** is concerned with the infrastructure including hardware, software, and access to the Internet;
- **Tier III** is concerned with the main activities which can be further divided into primary activities of teaching and learning and advanced activities of training and research using ICT for developing professional skills; and
- **Tier IV** exhibits the impact of universities at the societal (local) level, at the national and international levels as well.

Findings from the study at the universities in the western Himalayan region in India indicated that vision and planning in Tier I are insufficient if these are not supported by proper initiative by a visionary at the highest level in the university system with full support from the government. It was also noted by Sharma and Singh (2009) that a good academic curriculum at the teaching level is a very significant component.

It further requires good infrastructure (Tier II) in hardware, software and also fast access to the internet. The universities are meant (Tier III) to create knowledge and the professionally skilled manpower trained, not at the local level but at the international level. The performance will result in sound impact (Tier IV) at the national and international levels.

The Peoples Partnership government's position on tertiary education, TVET and lifelong learning is that the national strategy will be developed through an open and inclusive process that will engage key stakeholders, as well as persons from all walks of life, in dialogue, consultation and participative decision-making. Investment in education for sustainable development is an investment in the country's future and the strategy, when implemented will lead to a re-shaping and improving of the content of education (Policy of Tertiary Education, TVET and Lifelong Learning in Trinidad and Tobago (2010)). It can also be noted that in using the four tier framework, with respect to Tier I the government of Trinidad and Tobago has already articulated their vision for tertiary education and lifelong learning for sustainable development of the nation. The government is one hundred percent committed to this venture.

2.13 CONCLUSION

This chapter looked at a comprehensive review of available literature with regards to the outlined objectives which were articulated at the commencement of this paper and they remained unchanged.

To accomplish the goal of transforming the traditional paradigm of learning in the classroom (teacher-centred, lecture-based, text book based instruction to student-centred, interactive learning environment (The 1998 UNESCO World Education Report, *Teachers and Teaching in a Changing World*)) educators must have an implicit understanding of how the new technologies operate and further how they are to create and subsequently impact on existing learning environments. Students will have more responsibility thrust upon them with regards to their learning as well as the construction of their own knowledge. Technology, pedagogy and education seek to serve the international education community by supporting educators in the integration of ICT in teaching and learning.

To analyze how teaching methods and strategies have been influenced by ICT.

Literature looked at the traditional teaching methods and strategies employed at tertiary institutions. It also reviewed that with the introduction of ICT into the curriculum how it has impacted on the teaching methods and how ICT has influenced the teaching methods with respect to the delivery of course content.

Literature also reviewed how educators should equip themselves to keep up to date with technological advancement through legal and ethical issues in the classrooms.

The Literature also looked at the case relevance between epistemology and pedagogy in tertiary education

The literature reviewed the pedagogical as well as the epistemological issues related to the use of ICT in the delivery of the courses in tertiary educational institutions.

It also looked at the pedagogical and epistemological relevance to tertiary education.

In addition the literature also reviewed how to develop positive attitudes towards technology usage that support lifelong learning and collaboration amongst students.

The literature reviewed collaboration mechanisms that could be utilized amongst students through the use of technology. The concept of lifelong learning was also reviewed with emphasis on the usage of ICT tools.

The literature also discussed the positive attitudes that need to be developed if lifelong learning is to be achieved by students. The challenges faced by society- locally, regionally and internationally- by adopting technology should become part of the curriculum in such a way that students develop a positive attitude towards the usage of ICTs and consequently be able to engage in debates surrounding ICTs.

It should be noted that all literature was reviewed in developed countries whilst the study was conducted in Trinidad and Tobago, a developing nation where the government has articulated in their the National Agenda for Trinidad and Tobago – UNDP Workshop on Trinidad and Tobago Country Strategy Action Plan 2012 – 2015 held on August 2, 2011 seven interconnected pillars for a sustainable framework were outlined that will propel the country's development. One of the seven pillars was identified as people centred development which focuses on improving the education system and maintaining a seamless link for continuous learning. While another pillar, information and communication technologies will serve as a backbone to support the educated population maintain effective communication locally and globally and promote timely information sharing and management.

The government of Trinidad and Tobago has already articulated their vision for tertiary education, TVET and lifelong learning for sustainable development of the nation and the government is one hundred percent committed to this venture.

3.0 RESEARCH DESIGN

3.1 INTRODUCTION

The teaching profession is slowly evolving from emphasis on teacher-centred, lecture-based, text book based instruction to student-centred, interactive learning environments. This suggests that teachers need to learn new skills and also need to become lifelong learners to keep up to date with new knowledge, pedagogical issues and technology. Therefore, designing and implementing successful ICT-enabled education programmes is key to educators being more dynamic in their teaching strategies in the classroom (UNESCO, 1998).

To accomplish the goal of transforming the traditional paradigm of learning in the classroom (teacher-centred, lecture-based, text book based instruction to student-centred, interactive learning environment (The 1998 UNESCO World Education Report, *Teachers and Teaching in a Changing World*) educators must have an implicit understanding of how the new technologies operate and further how they are to create and subsequently impact on existing learning environments. Students will have more responsibility thrust upon them with regards to their learning as well as the construction of their own knowledge. Technology, pedagogy and education seek to serve the international education community by supporting educators in the integration of ICT in teaching and learning.

Tertiary educational institutions play a significant role in preparing their students to deal with issues surrounding the appropriate use of technology. This preparation is a key component of a 21st century education. Clear communicated policies, a curriculum that incorporates technology usage issues and modeling of ethical behavior should be key components of any educational institution's effort to guide students through the complexities of the digital world (UNESCO, 1998).

This study was conducted in Trinidad and Tobago and sought to address the following issues.

To analyze how teaching methods and strategies have been influenced by ICT.

It also sought to *analyze case relevance between epistemology and pedagogy in tertiary education.*

As a direct consequence of the aforementioned issues, the study also sought *to analyze how to develop positive attitudes towards technology usage that support lifelong learning and collaboration amongst students*.

3.2 INTRODUCTION TO RESEARCH METHODOLOGY

Saunders, Lewis and Thornhill (2007) explain how research methodology should be undertaken by considering the theoretical and philosophical assumption upon which research is based. Methodology, on the other hand, is described by Collis and Hussey (2003) as an approach to the research process from the theoretical groundwork for the collection and analysis of data. Primarily, a research methodology is concerned with the why, what, where, when and how data is collected and analyzed.

In this paper, the research design was outlined using the framework for research design as postulated by Creswell (2009) which is illustrated in the figure 3.1 below.

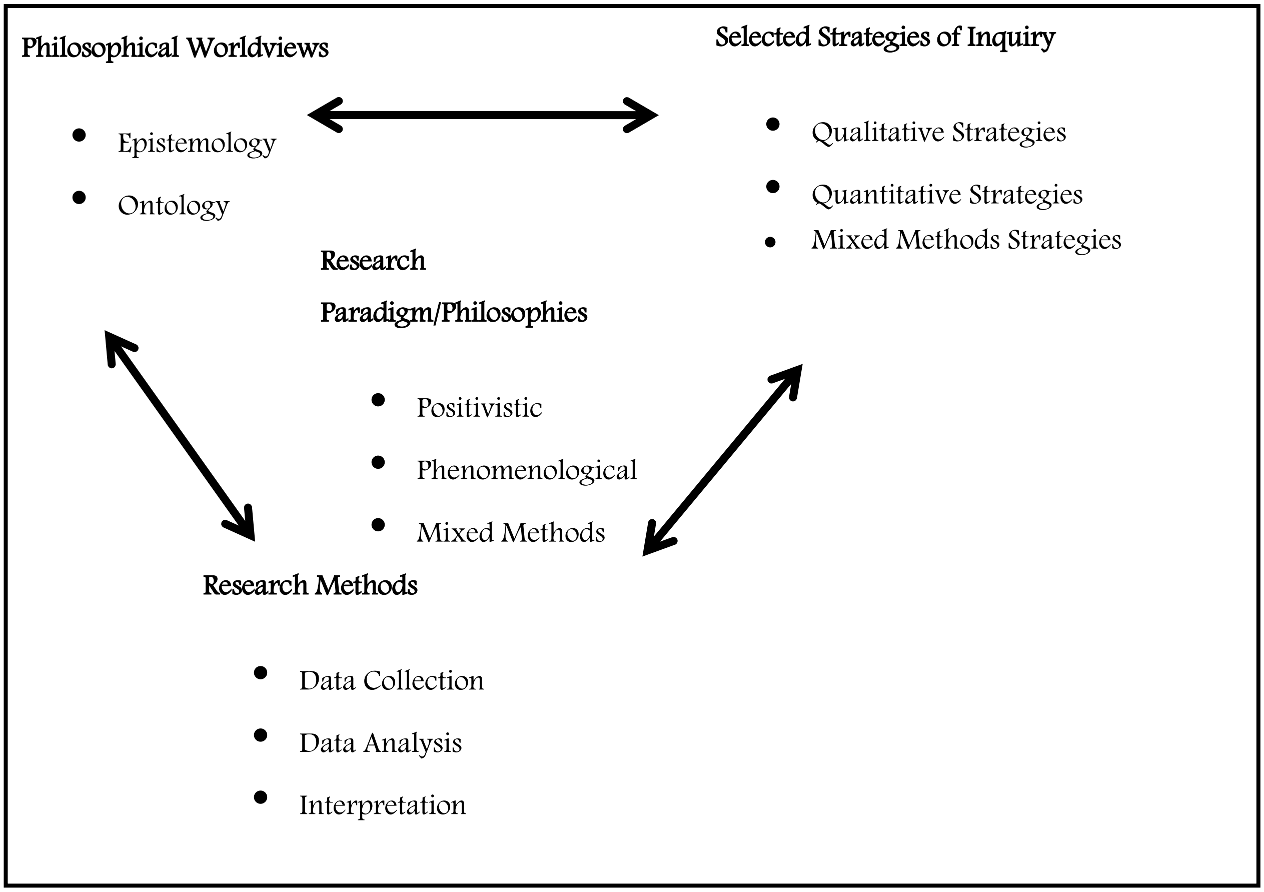


Fig 3.1: Framework of Design- Adapted from Creswell (2009)

3.3 PHILOSOPHICAL ASSUMPTION

The selected research paradigm will be based on the basic philosophical assumptions that underpin the research. This philosophical worldview according to Creswell (2009) has important implications not only for the paradigm chosen but also on the type of research methodology and the specific research method utilized. In addition, Guba and Lincoln (1994) as cited by Saunders, Lewis and Thornhill (2007:100) noted that “questions of methods are secondary to questions of paradigm”. The fundamental ontological and epistemological assumptions that influence the research design were considered.

Collis and Hussey (2003) state that Epistemology is the study of knowledge and its validity; moreover it is the science of obtaining, justifying and determining whether a given body of knowledge is adequate or inadequate knowledge. Maynard (1994:10) as cited by Crotty (1998:8) explains that "epistemology is concerned with providing a philosophical grounding for deciding what kinds of knowledge are possible and how we can ensure that they are both adequate and legitimate". The research will take an epistemological stance as the researcher is interested in a particular body of knowledge: *phenomena of influence of ICTs on teaching and learning strategies in the delivery of tertiary education in Trinidad and Tobago.*

Ontology according to Saunders, Lewis and Thornhill (2007) is concerned with the nature of reality, it is the assumption researchers have about the way the world operates and the commitment held to a particular view. Crotty (1998:10) states that "ontology is the study of being. It is concerned with 'what is', with the nature of existence, with the structure of reality as such."

Ontology has two positions – objectivism and subjectivism. Bryman (2008:18) explains that "objectivism is an ontological position that implies that social phenomena confront us as external facts that are beyond our reach or influence." Saunders, Thornhill and Lewis (2007:108) portray this position as social entities exist in reality external to social actors. Saunders, Thornhill and Lewis (2007:108) contend that the subjectivist view is that social phenomena are created from perceptions and consequent actions of social actors. It is a continual process in that through the process of social interaction these social phenomena are in constant state of revision. Remenyi et al (1998:35) as cited by Saunders, Lewis and Thornhill (2007:108) stress the necessity to study "the details of the situation to understand the reality or perhaps a reality working behind them". This is often associated with the term social constructionist where it is necessary to explore the subjective meanings motivating the actions of social workers in order for the researcher to be able to understand the actions.

The Ontological assumption was that of ***subjectivist***, where "reality is a projection of the human imagination" Collis and Hussey (2003:51). The reality or body of knowledge explored and evaluated was – *phenomena of influence of ICTs on teaching and learning strategies in the delivery of tertiary education in Trinidad and Tobago.* It is therefore necessary to elicit the views of participants in the research so as to determine their view of the "reality".

3.4 RESEARCH PARADIGM

Research paradigm refers to the way in which the research will be conducted. It falls into one of two general approaches: the positivistic and the phenomenological.

Positivistic Paradigm is research where it is assumed that social realities do not affect the research; it seeks facts or causes of social occurrences by applying logical reasoning (Creswell 2009). It is the quantitative measurement in investigations that test hypotheses with no regard for reality (objectivity), identifying causal relationships by the establishment of logic or fact.

Collis and Hussey (2003) state that phenomenological paradigm takes into consideration the subjectivity of realities on the investigation; it is difficult to distinguish the influence of the interrelation between the researcher and what is being investigated. These are extremes of a continuum and little research is conducted solely within the framework of one or the other. The following Table illustrates the major characteristics of the two approaches.

Positivistic	**Phenomenological**
Tests hypotheses	Explores hypotheses
Methodology focuses on statistics	Tends to be qualitative data
Tends to produce quantitative data	Uses small samples
Uses large samples	Concerned with generating theories
Data is highly specific and precise	Data is rich and subjective
The location is artificial	The location is natural
Reliability is high	Reliability is low
Validity is low	Validity is high
Generalizes from sample population	Generalizes from one setting to another

Table 3.1: Positivistic versus Phenomenological Approaches. Collis and Hussey (2003:47)

A ***phenomenological approach*** was adopted as it is necessary to capture the views of the key participants as discussed above and more importantly to analyze the phenomena critically from the participant's frame of reference. Furthermore, the problem under research is of a social science and human nature issue for which phenomenological paradigm is well adapted (Collis and Hussey, 2003).

3.5 RESEARCH APPROACH

In research two broad methods of reasoning are looked at – deductive and inductive approaches. Saunders, Lewis and Thornhill (2007) explain that deductive reasoning works from the more general to the more specific. It is sometimes informally referred to as the “top-down” approach whereby a conclusion follows logically from premises (facts). This is illustrated in Fig 3.2.

Robson (2002) five sequential stages are used by Saunders, Lewis and Thornhill (2007:117) to highlight the deductive process:

- Deducing a hypothesis about the relationship between two variables
- Expressing the hypothesis in operational terms (how the variables are to be measured) which propose a relationship between two specific concepts or variables
- Testing the operational hypothesis
- Examining the specific outcome of the inquiry (it will tend to confirm the theory or indicate the need for modification)
- Modify the theory in the light of the findings, if necessary

In contrast, inductive reasoning moves from specific observations to broader generalizations and theories. This approach is informally called the “bottom up” approach whereby a conclusion is likely based on premises and it also involves some degree of uncertainty. The following diagram (Fig 3.2) shows the inductive reasoning approach. Table 3.3 illustrates the major differences between deductive and inductive approaches to research.

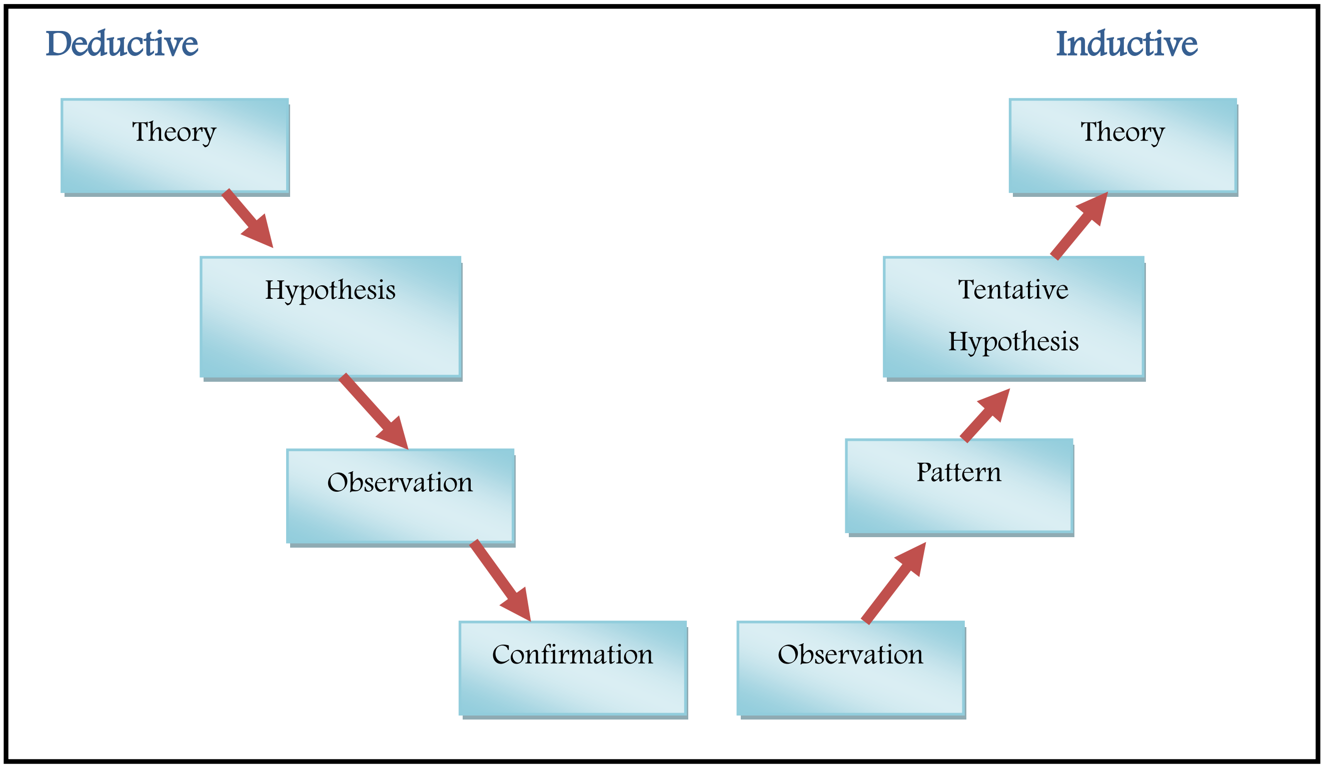


Fig 3.2: Deductive versus Inductive Research Approach: Adapted from Creswell (2009)

Deductive Approach	**Inductive Approach**
Scientific Approach	Gaining an understanding of the meanings human attach to events
Moving from theory to data	A close understanding of the research context
The need to explain casual relationships	The collection of qualitative data

between variables	
The collection of quantitative data	A more flexible structure to permit changes of research emphasis as the research progresses
The application of controls to ensure validity of data	A realization that the researcher is part of the research process
The operationalization of concepts to ensure clarity of definition	Less concern with the need to generalize
A highly structured approach	
Researcher independence of what is being researched	
The necessity to select samples of sufficient size in order to generalize conclusions	

Table 3.3: Major differences between deductive and inductive approaches to research: Saunders, Lewis and Thornhill (2007:120)

This process of inquiry supports an ***Inductive approach*,** which considers the individual inferences in a complex situation Creswell (2009). This Inductive Approach allowed a better understanding of the nature of the issues and analyzes the data collected to formulate a theory (Saunders, Lewis and Thornhill, 2009).

3.6 RESEARCH STRATEGY

Saunders, Lewis and Thornhill (2009:130) state that the research strategy will be the general plan on how the researcher will go about answering his research question specifying the methods for data collection and the respective analytical tools to be employed for the data collected.

The classification of the research purpose utilized in research methods' literature is the threefold one of exploratory, descriptive and explanatory (Saunders, Lewis and Thornhill, 2009:133).

Exploratory research is a valuable way of discovering "what is happening: to seek new insights: to ask questions and to assess phenomena in a new light" (Robson 2002:59 as cited in Saunders, Lewis and Thornhill, 2009:133). The principal methods of conducting exploratory research are:

- Search by literature
- Interviewing "experts" in the subject domain
- Conducting focus group interviews.

Robson (2002:59) as cited in Saunders, Lewis and Thornhill (2009:134) states that the object of **descriptive research** is "to portray an accurate profile of persons, events or situations". This research maybe a situational analysis prior to the actual research in order for the researcher to have a clear understanding of the phenomena on which to collect the data before the actual collection for the intended purpose of the research.

Studies that establish cause and effect relationships in an attempt to explain why things happen are deemed **explanatory studies**, Saunders, Lewis and Thornhill (2009:134). The emphasis is on studying a situation or problem in order to explain the relationships between variables.

Based on the aforementioned design, strategies were selected for collection of data. Saunders, Lewis and Thornhill (2009:135) explain that the choice of the research strategy will be guided by the research question and objective(s), the extent of existing knowledge, the amount of time and resources available as well as the philosophical underpinnings.

The methodology was indicative of a phenomenological approach. There are several types, according to Collis and Hussey (2003:66) under phenomenological associated methodologies which include: Action Research, Case Studies, Ethnography and Grounded Theory

Collis and Hussey (2003:67) state that **Action Research** is a type of research designed to find an attractive way of bringing about a conscious change in a partly controlled environment. The main aim of action research is to enter into a situation, attempt to bring about a conscious change and to monitor the results.

Denscombe (2010:126) provides four characteristics of Action Research:

1. *Practical Nature*. It is aimed at dealing with real-world problems and issues, typically at work and in organizational settings.
2. *Change*. Both as a way of dealing with practical problems as well as discovering more about the phenomena. Change is regarded as an integral part of research.
3. *Cyclical Process*. Research involves a feedback loop in which the initial findings generate possibilities for change which in turn is implemented as a prelude to further investigation.
4. *Participation*. Practitioners are the crucial people in the research process. Participation is an active process.

According to Stake (1995) as cited in Creswell (2009:13) **Case Studies** is a strategy of inquiry in which the researcher explores in depth a program, event, activity, process or one or more individuals. Cases are bounded by time and activity and the researchers collect detailed information using a variety of data collection procedures over a period of time.

Yin (2009:18) gives a two-fold technical definition of case study as:

1. A case study is an empirical inquiry that
    - Investigates a contemporary phenomenon in depth and within its real-life context, especially when
    - The boundaries between phenomenon and context are not clearly evident

2. The case study enquiry
    - Copes with the technically distinctive situation in which there will be many more variables than data points and as one result
    - Relies on multiple sources of evidence with data needing to converge in a triangulating position and as another result
    - Benefits from the prior development of theoretical propositions to guide data collection and analysis.

Case Studies are commonly described as exploratory research, used in areas where there are few theories or a deficient body of knowledge. (Collis and Hussey 2003:68).

Scapens (1990) as cited in Collis and Hussey (2003:68) adds the additional types:

- Descriptive : where the objective is restricted to describing current practice
- Illustrative : where the research attempts to illustrate new and possibly innovative practices adopted by particular companies
- Experimental :where the research examines the difficulties in implementing new procedures and techniques in an organization and evaluating benefits
- Explanatory: where existing theory is used to understand and explain what is happening.

Creswell (2009:13) explains that **Ethnography** is a strategy of inquiry whereby the researcher studies an intact cultural group in a natural setting over a prolonged period of time by collecting, primarily, observation and interview data.

The holistic perspective of Ethnography as stated by Malinowski (1922: xvi) cited in Denscombe (2010:80) is "one of the first conditions of acceptable Ethnographic work certainly is that it should deal with the totality of all social, cultural and psychological aspects of the community, for they are also interwoven that no one can be understood without taking into consideration all the others."

Charmaz, (2006); Strauss and Corbin, (1990, 1998) cited in Creswell (2009:13) explain that **Grounded Theory** is a strategy of inquiry in which the researcher derives a general, abstract theory of a process, action or interaction grounded in the views of the participants. The process involves using multiple stages of data collection and refinement and interrelationship of categories. Two major characteristics of grounded theory are the constant comparison of data with emerging categories and theoretical sampling of different groups to maximize the similarities and differences of information.

Collis and Hussey (2003) state that Action Research "assumes that the social world is constantly changing and the researcher and the research itself are part of this change". This study is underpinned by this assumption, as it is important to note that the researcher is a lecturer at one of the tertiary educational institutions under investigation. Eden and Huxham (1996:75) as cited by Saunders, Lewis and Thornhill (2007:141) state that "*the findings of action research results from involvement with members of an organization over a matter which is of genuine concern to them".*

Furthermore, the classification of the research purpose is to undertake an ***exploratory study*** of *phenomena of influence of ICTs on teaching and learning strategies in the delivery of tertiary education in Trinidad and Tobago*. As postulated by Collis and

Hussey (2003:67) the main aim of action research is to “bring about a conscious change in a controlled environment for a particular situation.”

3.7 RESEARCH CHOICES

Qualitative Research is preferred over quantitative as Creswell (2007:12) states that Qualitative “is a means for exploring and understanding the meaning individuals ascribe to a social or human problem” can be adopted. Creswell (2009:12) continues that quantitative research as a type of research is “explaining phenomena by collecting numerical data that are analyzed using mathematically based methods (in particular statistics)”.

The qualitative approach involves:

- Identify the questions, procedures and issues
- Collect pertinent data
- Inductively analyse data with a framework of basic themes
- Make inferences from the data interpretation
- The theory will emerge from the data analysis
- Result in the formulation of a theory

The following table illustrates the concepts usually associated with both quantitative and qualitative methods.

Concepts usually associated with Quantitative method	**Concepts usually associated with Qualitative method**
Type of Reasoning	
Deduction	Induction
Objectivity	Subjectivity
Causation	Meaning
Type of Question	
Pre-specified	Open-ended
Outcome-oriented	Process-oriented
Type of Analysis	
Numerical estimation	Narrative description
Statistical inference	Constant comparison

Table 26.4: Usual distinctions between quantitative and qualitative methods (Trochim, 2006)

The Researcher used these practices of research		
Quantitative Approach	Qualitative Approach	Mixed Methods Approach
Tests or verifies theories or explanations	Positions himself or herself	Collects both quantitative and qualitative data
Identifies variables to study	Collects participant meaning	Develops rationale for mixing
Relates variables to	Focuses on a single	Integrates the data at

questions	concept or phenomenon	different stages of inquiry
Uses standards of validity and reliability	Brings personal values into the study	Presents visual pictures of the procedures in the study
Observes and measures information numerically	Studies the context or setting of participants	Employs the practices of both quantitative and qualitative research
Uses unbiased approaches	Validates the accuracy of the findings	
Employs statistical procedures	Makes interpretation of the data	
	Creates an agenda for change or reform	
	Collaborates with the Participants	

Table3.5: Comparing Practices by Methods: Creswell (2009: Chapter 1)

Tashakkori and Teddlie (2003) cited in Saunders, Lewis and Thornhill (2007:145) contend that various methods are in fact practical if they seek to provide the opportunity to better answer the research question and evaluate findings consequently made. In choosing the research method one may therefore utilize a single data collection technique and corresponding data analysis procedure which is termed the ***mono*** method.

A researcher may utilize more than one data collection technique and data analysis procedures to answer the research question, this is known as **multiple method** approach.

Mixed method approach is the general term used when both qualitative and quantitative data collection techniques and data analysis procedures are used in the research design. It is important to note that in the mixed method approach, qualitative and quantitative data collection techniques and data analysis procedures are parallel or sequentially but does not combine them. Figure 3.3 illustrates the different research choices that can be adopted.

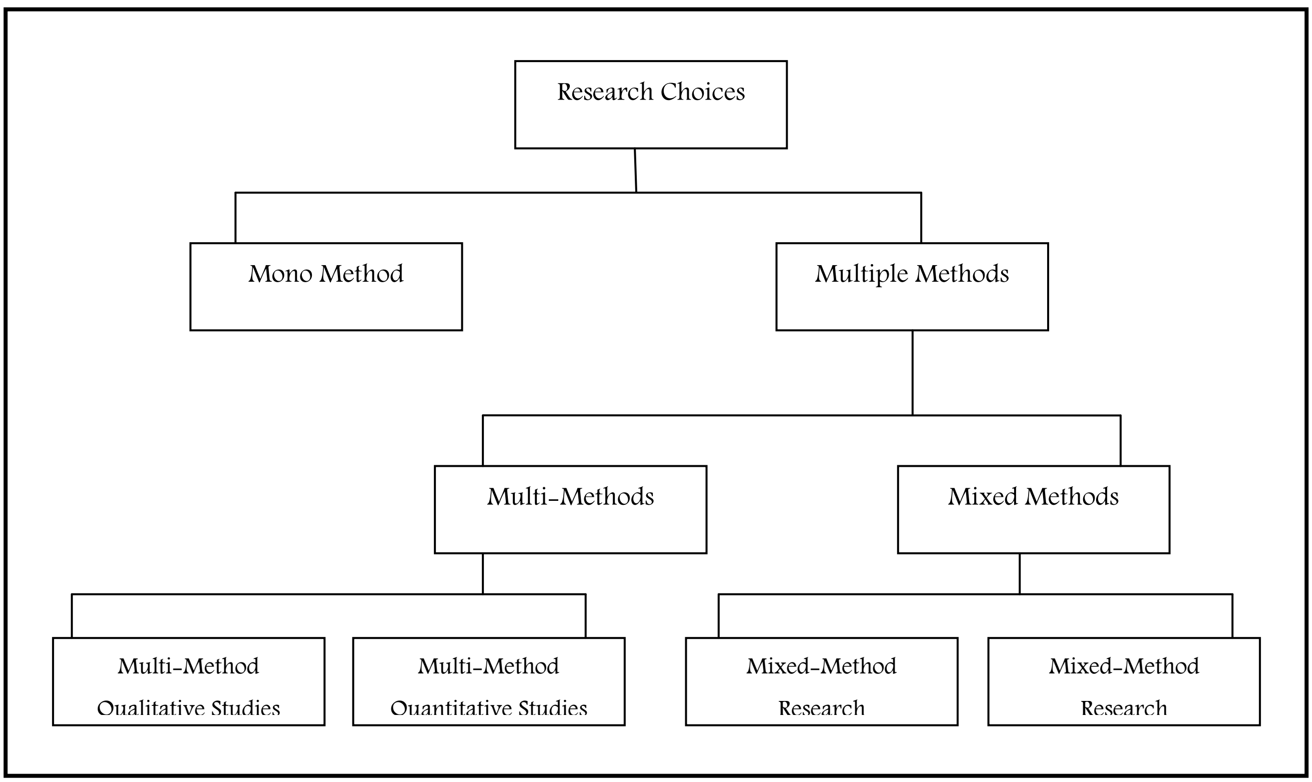


Fig 3.3: Research choices: Adapted from Saunders, Lewis Thornhill (2009:146)

For this research, the researcher collected ***qualitative data*** using data collection tool of questionnaires and analyzed the data quantitatively. A ***mixed-method approach*** was adopted for this research.

3.8 TIME HORIZON

Saunders, Lewis and Thornhill (2007:148) indicate that an important question to be framed in planning a research project is “Do I want my research to be a “snapshot” taken at a particular time or do I want it to be more akin to a “diary” and be a representation of events over a given period”. The “snapshot” representation is what is referred to as cross-sectional whilst the “diary” approach is termed longitudinal.

Cross-sectional studies seek to describe an incidence of a phenomenon at a single moment in time and are usually conducted over a short period of time (Saunders, Lewis and Thornhill, 2007:148). Cross-sectional studies often use the survey strategy (Easterby-Smith, Thorpe and Lowe, 2002; Robson, 2002) cited in Saunders, Lewis and Thornhill, (2007:148).

Saunders, Lewis and Thornhill (2007:148) explain that **longitudinal studies** involve studying the same groups of participants over a period of where the time period could range from months to years. One of the main strengths of this type of study is the capacity that it has to study change and development. Adams and Schvaneeldt (1991) as cited in (Saunders, Lewis and Thornhill, 2007:148) point out that “in observing people or events over time the researcher is able to exercise a measure of control over variables being studied, provided they are not affected by the research process itself."

The research was a ***cross-sectional study*** where a mixed method approach of data collection will be utilized, as discussed above; it focused on particular phenomena at a particular time - *phenomena of influence of ICTs on teaching and learning strategies in the delivery of tertiary education in Trinidad and Tobago.*

3.9 DATA COLLECTION METHODS

3.9.1 SELECTION OF SAMPLE

Saunders, Lewis and Thornhill (2007:204) state that *"sampling techniques provide a range of methods that enable you to reduce the amount of data you need to collect by considering only data from a subgroup rather than all possible cases".* There are two types of sampling techniques that have been identified where probability samples most commonly associated with survey-based research strategies, facilitates each known case being selected from the population. Probability samples are listed as simple and quasi random, stratified, systemic and stratified. Whereas, non-probability samples suggest that it is unlikely that each case will be selected from the population and are scheduled as convenience, purposive and quota. The various types are further detailed in Table 3.5 below.

PROBABILITY	
Simple Random	Equal chance of being selected at random using random number table or computer until sample size is reached
Stratified	Population is divided into relevant strata based on attributes and a random sample drawn from this subset
Systemic	Selecting the sample at regular intervals from sampling frame, every nth
Clustered	Clusters (each with multiple units) within a sampling frame are randomly selected.
NON PROBABILITY	
Convenience	Selection based on availability or ease of inclusion
Purposive	Selection of individuals from whom you may be inclined to get more data, judgmental
Quota	Selecting respondents for a survey that fall into some category e.g. small, medium and large
Snowball	Making contacts then asking these contacts to identify other contacts
Self selection	Allows participants to express their desire to participate

Table 3.6: Types of Samples. Adapted from Saunders, Lewis and Thornhill (2007) Research Methods for Business Students

Data was collected at the School of Accounting and Management during the period March 2014 to May 2014, the sample was selected randomly in clusters. The clusters consisted of students studying Business Management as well as Information

Technology courses from both the undergraduate and postgraduate levels. Six hundred and forty (640) questionnaires were distributed in total.

3.9.2 PRIMARY DATA COLLECTION METHODS

Primary data as stated by Saunders, Lewis and Thornhill (2007) are data collected for the research project being undertaken. Primary data for this project was collected using questionnaires distributed to students at the School of Accounting and Management. Students studying Business Management as well as Information Technology courses from both the undergraduate and postgraduate levels.

3.9.2.1 QUESTIONNAIRE

A questionnaire is a list of carefully structured questions, chosen after considerable testing, with a view of eliciting reliable responses from a chosen sample. The aim is to find out what a selected group of participants do, feel and think. Collis and Hussey (2003:173).

There are many types of questionnaires; they vary in terms of their purpose, their size and appearance. To qualify as a research questionnaire, according to Denscombe (2010:155), they should do the following three things:

1. Be designed to collect data which can be subsequently used in data analysis;
2. Consist of a written list of questions; and
3. Gather data by asking people directly about the points gathered with the research.

Questionnaires are the most productive when:

- Used in large numbers of respondents in many geographic locations;
- What is required tends to be fairly straightforward information – relatively brief and uncontroversial;
- There is a need for standardized data from identical questions – without requiring face-to-face personal interaction;
- The respondents can be expected to read and understand the questions; and
- The social climate is open sufficiently to allow full and honest answers.

(Denscombe (2010:156).

There are many advantages to questionnaires according to Denscombe (2010:170):

- Questionnaires are economical, in that, they can supply a considerable amount of research data for a relatively low cost of materials, time and finances
- Data Accuracy
- They supply standardized answers, to the extent, that all respondents are posed with exactly the same questions, with no scope for any variations. There is very little capacity for the data to be affected.

Denscombe (2010:170) suggests some disadvantages which include:

- Pre-coded questions can be frustrating for respondents thus deterring them from answering;
- Pre-coded questions can also bias the findings towards the researcher rather than the respondents' point of view;

- Questionnaires offer little opportunity for the researcher to check the truthfulness of the answers given by the respondents.

Once the questionnaire was designed, it was firstly peer reviewed by fellow lecturers who lectured courses in Information Technology as well Business Management to ensure that the questions were clearly readability of questions and the options for each question.

After being peer reviewed, the questionnaire was subsequently piloted to a group of twenty students. This was necessary to ensure that students were able understand the questions posed and were able to complete the questions.

In this research, five hundred (500) questionnaires were distributed to undergraduate students studying Business Management and Information Technology courses in both the North and South Campuses at the School of Accounting and Management. Eighty percent (80%) – four hundred (400) questionnaires – were completed by students and were subsequently returned to the researcher. One hundred and forty (140) questionnaires were distributed to post graduate (MBA and MSc) students and 71% (100 questionnaires) were completed and returned to the researcher.

Questions in Section 1 of the Student Questionnaire requested general information from all students surveyed. These questions were aimed at the general demographics of the students in terms of their area of study, year of study, option of study and age group. This section also looked at the students' IT skills from commencement of study to the time when this student questionnaire was distributed and also to ascertain whether or not there was an improvement of their IT skills.

Questions included:

Area of study

Year of study

Option of study

Age Group

How do you rate your IT skills at the start of your study?

What level are your IT skills at present?

Do you think that your IT skills have improved since starting your studies?

Objective 1: To analyze case relevance between epistemology and pedagogy in tertiary education

Sections 2 and 3 of the Student questionnaire were designed to help gain an understanding of epistemology in tertiary education.

Section 2 students were asked to choose between doing and watching

Doing - I often produce off-the-cuff ideas that at first might seem silly or half-baked.
Watching - I am thorough and methodical.

Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people.

Doing - I am flexible and open minded. **Watching** - I am careful and cautious.

Doing - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it.

Doing - I am happy to have a go at new things. **Watching** - I draw up lists up possible courses of actions when starting a new project.

Doing - I like to get involved and to participate. **Watching** - I like to read and observe.

Doing - I am loud and outgoing. **Watching** - I am quiet and somewhat shy.

Doing - I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

Doing - I speak fast, while thinking. **Watching** - I speak slowly, after thinking.

Section 3 students were asked to choose between thinking and feeling:

Thinking - I ask probing questions when learning a new subject. **Feeling** - I am good at picking up hints and techniques from other people.

Thinking - I am rational and logical. **Feeling** - I am practical and down to earth.

Thinking - I plan events down to the last detail. **Feeling** - I like realistic, but flexible plans.

Thinking - I like to know the right answers before trying something new. **Feeling** - I try things out by practicing to see if they work.

Thinking - I analyze reports to find the basic assumptions and inconsistencies. **Feeling** - I rely upon others to give me the basic gist of reports.

Thinking - I prefer working alone. **Feeling** - I enjoy working with others.

Thinking - Others would describe me as serious, reserved, and formal. **Feeling** - Others would describe me as verbal, expressive, and informal.

Thinking - I use facts to make decisions. **Feeling** - I use feelings to make decisions.

Thinking - I am difficult to get to know. **Feeling** - I am easy to get to know.

To gain an understanding of the epistemology and pedagogy in tertiary education, the following questions were posed to the students

What computer applications do you usually use?

List in order of importance (highest to lowest) your opinion about the use of Information and Communication Technology (ICT) in your learning? ***(1- highest and 10 - lowest)***

Use of ICT has an impact on learning process

ICT accelerates learning process

Use of ICT improves grades

Teachers should use ICT during teaching

Feel fear from the use of ICT

Use of ICT for getting information is better than in the library

Know how to use ICT but not interested in using it for learning

Getting information from print material is better than using ICT

Cannot study without the use of ICT tools

Find it time consuming to use ICT in learning

What do you use the Internet for?

List the number of hours per week you spend in different online information searching activities? (Browsing, Scanning Journals, Reading Emails, Downloading Articles, Chatting with friends)

What databases do you use for searching your subject topics?

What critical thinking skills have been enhanced by use of ICT? (Analyzing, Applying standards, Discriminating, Information Seeking, Logical Reasoning, Predicting, Transforming Knowledge)

Does ICT enhance students' skills of grammar, spelling, punctuation, listening, speaking, reading, writing

Objective 2: To analyse how teaching methods and strategies have been influenced by IT.

To analyze how teaching methods and strategies have been influenced by IT the following questions were posed to students of the survey.

What are some of the problems faced in accessing e Resources?

Students were asked to Agree, Tend to Agree, Tend to Disagree or Disagree with the following questions

Do you think that ICT has enhanced students' participation and feedback to teachers?

Do you think that ICT has enhanced collaboration amongst students?

Do you agree that ICT can enhance teacher and student interaction?

Do you agree that ICT tend to increase students' learning motivation?

What do you perceive as teachers' skills in ICT? *(tick as many as applicable)*

What is the extent of teachers' integration of ICT into teaching and learning processes?

What Hardware used by teachers?

What Software used by Teachers in the classroom?

Students were asked to choose one of four options (Never, Occasionally, Frequently, Almost Always)

Frequency of use of ICT on teaching activity:

Giving class instructions

Communicating with students

Organizing class discussion, demonstrations and presentations

Assessing students' learning through tests

Sending feedback to students

Supporting collaboration amongst students

Ratio of technical ICT support staff to computer labs

Students were asked to Agree, Tend to Agree, Tend to Disagree or Disagree with the following questions

ICT technical support is efficient

ICT tasks & problems solved in timely and efficient manner

What is the extent of technical ICT assistance?

Objective 3: To analyse how to develop positive attitudes towards technology usage that support lifelong learning and collaboration amongst students.

The following questions were posed to students of the survey to gauge if positive attitudes were developed towards technology usage that will support lifelong learning and collaboration amongst students.

Students were asked to Agree, Tend to Agree, Tend to Disagree or Disagree with the following questions

Do you think that ICT has enhanced students' participation and feedback to teachers?

Do you think that ICT has enhanced collaboration amongst students?

Do you agree that ICT can enhance teacher and student interaction?

Students were asked to choose one of four options (Never, Occasionally ,Frequently, Almost Always)

Frequency of use of ICT on teaching activity:

Giving class instructions

Communicating with students

Organizing class discussion, demonstrations and presentations

Assessing students' learning through tests

Sending feedback to students

Supporting collaboration amongst students

3.9.3 SECONDARY DATA COLLECTION METHODS

Saunders, Lewis and Thornhill (2007:611) explain that secondary data is data used for a research project that were originally collected for some other purpose. It is data that already exists such as books or documents.

For this research, secondary data have been collected from the following sources. Listed below are some examples.

- Books
- Articles from Magazines and Journals (for example)
    - EDUCAUSE Centre for Applied Research: Research Bulletin.
    - . *Journal of Computer Assisted Learning,*
    - Indian Journal of Science and Technology
    - Contact Magazine, Trinidad and Tobago Chamber of Industry and Commerce,
- Electronic Databases
- The Internet
- Published Statistics (for example)
    - Nationmaster, *Trinidad and Tobago Education Statistics*
    - World Bank Institute http://go.worldbank.org/UB2A8VBUV0
- Conference Papers
    - Professional Bodies (for example) UNESCO Education. http://portal.unesco.org/education/
    - UNESCO/IFIP,
    - European Commission
    - ACMA. (http://www.acma.gov.au/WEB/STANDARD/pc=PC_9085
- Ministry of Education, Trinidad and Tobago
- Ministry of Science, Technology and Tertiary Education, Trinidad and Tobago

3.10 DATA ANALYSIS

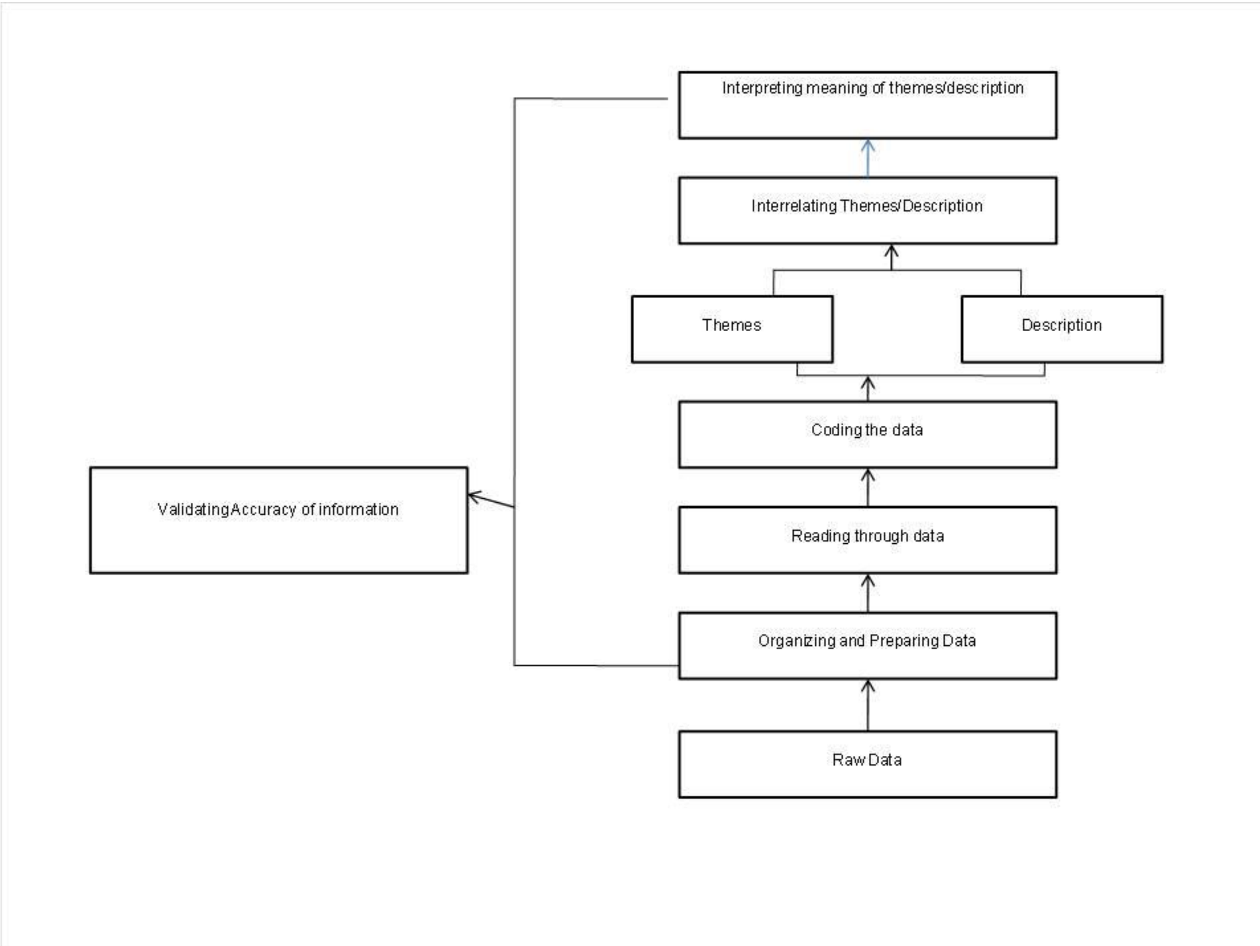


Fig 3.4: Validating Accuracy of Information in Qualitative Analysis. Adapted from Creswell 2009)

The data collected from the questionnaires are in fact raw data. With the questionnaires, the data was collated once they were collected from the respondents. The next step was to code the variables of each question of the questionnaire since the data was analyzed using IBM SPSS Statistics software version 20. The data was analyzed using the various data analysis tools as explained in the following table.

CATEGORY	DATA ANALYSIS TOOL	BRIEF DESCRIPTION
Descriptive Statistics	Descriptive Statistics	Show univariate statistics for data. Information includes mean, , median, mode , standard error, standard deviation, sample variance, skewness, range, minimum, maximum, sum, count, smallest, largest, confidence level.
Correlation Functions	Correlation	Tell how closely related two data sets vary together in a scale of +1 to -1. Closer to +1: Data correlates closely with itself 0: No correlation Closer to -1: Small values of one variable tend to be associated with large values of the other
	Pearson's correlation coefficient	show the measure of the strength of a linear association between two variables
	Spearman's ranked	show the strength of a monotonic

	coefficient	relationship between paired variables
	Covariance	The covariance tool was used to examine each pair of measurement variables to determine whether the two measurement variables tend to move together — that is, whether large values of one variable tend to be associated with large values of the other (positive covariance), whether small values of one variable tend to be associated with large values of the other (negative covariance), or whether values of both variables tend to be unrelated (covariance near 0 (zero)). The outputs can be analyzed as follows: +ve value: Large values of one variable tend to be associated with large values of the other 0: No correlation -ve value: Small values of one variable tend to be associated with large values of the other
	Regression Analysis	Will use the "least squares" method to fit a line through a set of observations. It will analyze how a single dependent variable is affected by the values of one or more

		independent variables.
	Pearson's Chi Square test of independence	Was used to show the relationship between two categorical variables. statistical method was used to assess the goodness of fit between a set of observed values and those expected theoretically
Graphical Methods	Basic Histogram	Will give a graphical representation showing the distribution of data. It is an estimate of the probability distribution of a continuous variable
	Pareto Chart (Sorted Histogram)	A chart that contains both bars and a line graph, where individual values / frequencies are represented in descending order by bars, and the cumulative total is represented by the line graph

Table3.7: Data Analysis Tools

The data was analyzed where particular attention was paid to themes developing as well as trends and patterns emerging.

To provide knowledge and understanding of the phenomenon under study, the documents were thematically analyzed, as outlined by Braun and Clarke (2006). Thematic analysis is a method for identifying, analyzing, and reporting patterns (themes) within data that minimally organizes and describes the data set in (rich) detail (Braun & Clarke, 2006; Cohen, Manion & Morrison, 2007; Guest, MacQueen & Namey, 2012; Vaismoradi, Turunen & Bondas, 2013). Content analysis and thematic analysis are two commonly used approaches in data analysis. They are used interchangeably, and there are many similarities between the approaches, including cutting across data and searching for patterns and themes; the main difference is that content analysis offers more opportunity for data quantification (Vaismoradi, Turunen & Bondas, 2013). Thematic analysis "moves beyond counting explicit words or phrases and focuses on identifying and describing both implicit and explicit ideas within the data, that is, themes" (Guest, MacQueen, & Namey, 2012:10).

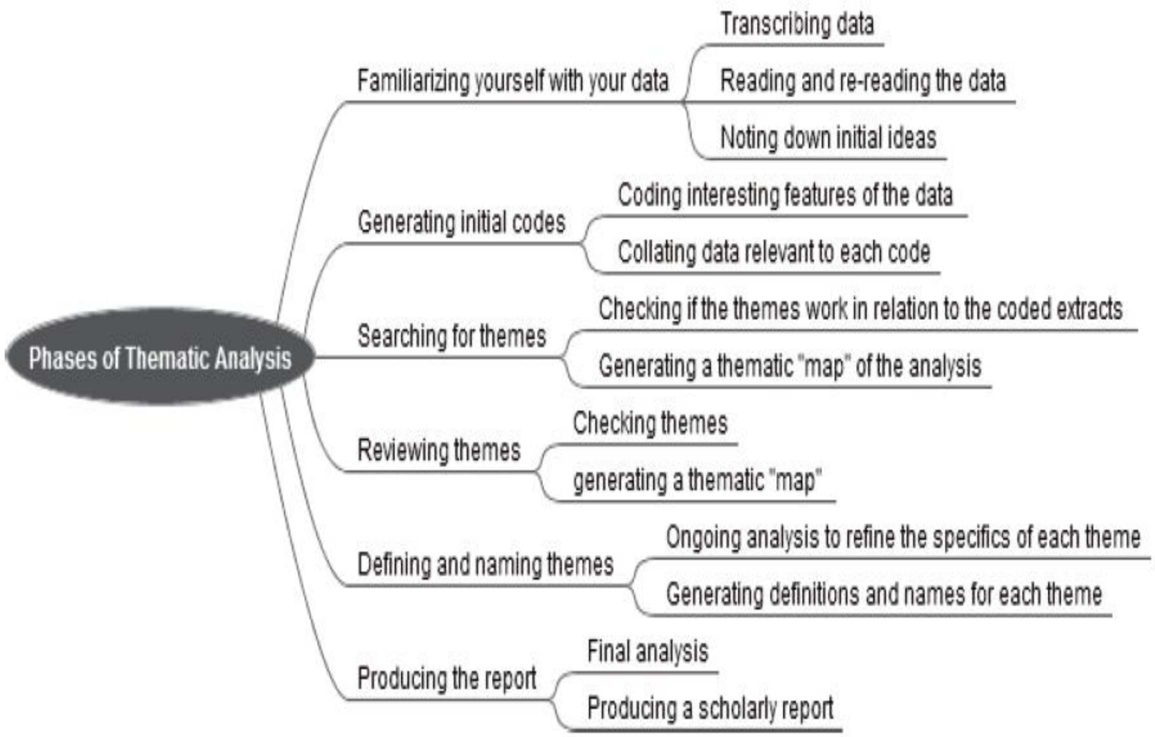


Fig 3.5: Phases of Thematic Analysis adapted from Braun & Clarke (2006:87)

The themes emerged through several readings and a theoretical (‘top down’) process of condensing identified key concepts into major categories by determining the main contribution of the literature sources. Finally, the researcher reviewed each article in each category multiple times to identify information that could be compared, contrasted, discussed, critiqued and synthesized.

3.11 RELIABILITY AND VALIDITY OF DATA COLLECTED

The issue of reliability and validity is pivotal to the degree to which the results can answer the research question and fulfill the objectives of this research.

Easterby-Smith, Thorpe and Lowe (2002:53) cited in Saunders, Lewis and Thornhill (2009:149) explain that reliability is the extent to which data collection techniques will yield consistent findings, similar observations would be made or conclusions reached by other researchers or there is transparency in how sense was made from the raw data.

Validity is explained by Saunders, Lewis and Thornhill (2009:614) to be the extent to which data collection method or methods accurately measure what they were intended to measure.

During this research a number of tactics were implemented in order to ensure a high degree of reliability and validity:

- Pre-testing the questionnaire to ensure consistent interpretation of the question by respondents;
- Questionnaires were based on solving the research questions and finding answers to these research objectives solely; and
- There was no influence from the researcher during data collection.

Reliability and validity are very important concepts to take into consideration when conducting qualitative research, since they help to maintain then objectivity of the research in which the researcher determines and checks the accuracy or credibility of the findings through strategies or procedures (Creswell, 2008). The researcher tried to design research which is auditable, i.e. transparent and replicable; if another researcher can clearly follow the decision trail used by the researcher in the study, then the results should be the same over time and over instruments (Koch, 2006; Cohen et al.,2007).

3.12 ETHICS

"Ethics refers to the appropriateness of behaviour in relation to the rights of those who become the subjects of your work or who are affected by it" Saunders, Lewis and Thornhill (2007:153). Blumberg et al (2005:92) cited in Saunders, Lewis and Thornhill (2007:178) defines ethics as, "Ethics are moral principles, norms or standards of behavior that guide moral choices about our behavior and our relationships with others".

The goal of ethical research is to ensure that no one is harmed or suffers as a consequence of research activities. In general, ethics in research is mainly concerned with:

- how participants in the research are treated,
- how data are collected from participants and maintained confidentiality, and
- How the findings are analyzed and reported.

Some factors considered during this research so as to ensure:

- the privacy and confidentiality of possible and actual participants
- the voluntary nature of participation and the right to withdraw
- that informed consent is received and possible deception of participants is removed

- the maintenance of confidentiality of data
- the reactions of participants to the way in which you seek to collect data was considered the effects on participants of the way data is used

3.13 LIMITATIONS

As with any research methodology adopted there would be inherent limitations. This will be expected to be at a minimal as a direct consequence of the supervision team from Anglia Ruskin University, Dr Rob Willis, Dr John Webb and Dr. Simon Evans. Questionnaires were self administered as it was expected to be time and resource consuming but the fact finding period of approximately one year for this research was prudently utilized so that the time and resource issue was greatly minimized.

3.14 CONCLUSION

The research design outlined used Creswell's framework. In conclusion, the following framework to be adopted for this research is as follows:

Epistemology	**Phenomenology**
Ontology	**Subjectivism**
Research Approach	**Inductive**
Research Design	**Exploratory**
Strategy	**Case Study**
Research Choice	**Mixed Method**
Time Horizon	**Cross Sectional**
Sampling	**Clustered Random Non-Probability**
Data Collection	**Secondary Data** **Primary Data – questionnaire**
Data Analysis	**Thematic**

Table 3.8: Author's Research Framework (2016)

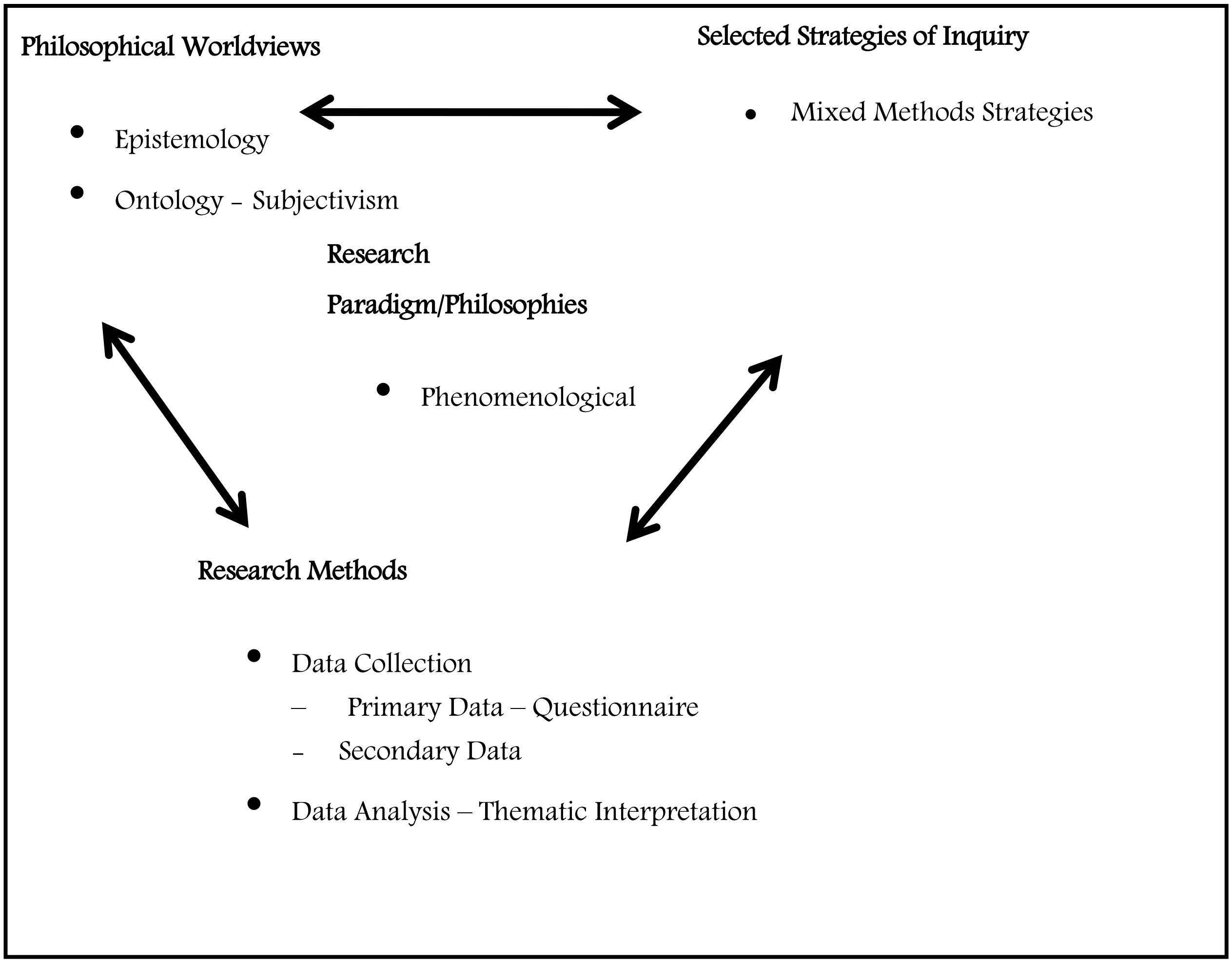


Fig3.6: Author's Research Framework (2016)

4.0 FINDINGS AND ANALYSIS

4.1 INTRODUCTION

Data was collected at the School of Accounting and Management during the period March 2014 to May 2014, the sample was selected randomly in clusters. The clusters consisted of students studying Business Management as well as Information Technology courses from both the undergraduate and postgraduate levels. Six hundred and forty (640) questionnaires were distributed in total. Five hundred (500) questionnaires were distributed to undergraduate students studying Business Management and Information Technology courses in both the North and South Campuses. Eighty percent (80%) – four hundred (400) questionnaires – were completed by students and were subsequently returned to the researcher. One hundred and forty (140) questionnaires were distributed to post graduate (MBA and MSc) students and 71% (100 questionnaires) were completed and returned to the researcher. There was a high percentage of return of questionnaires, in the case of the undergraduates 80% and for postgraduate courses, 71%. Using the KrohmBack alpha value it showed that there was also a high validity and reliability of the data collected.

4.2 SECTION 1: GENERAL INFORMATION

4.2.1 AREA OF STUDY

Students from both Business and Information Technology were selected for this survey. As illustrated in the following chart two hundred and ninety five (295) students were studying Business which accounted for 59% of the sample and the other 41% (two *hundred* and five students) were studying Information Technology.

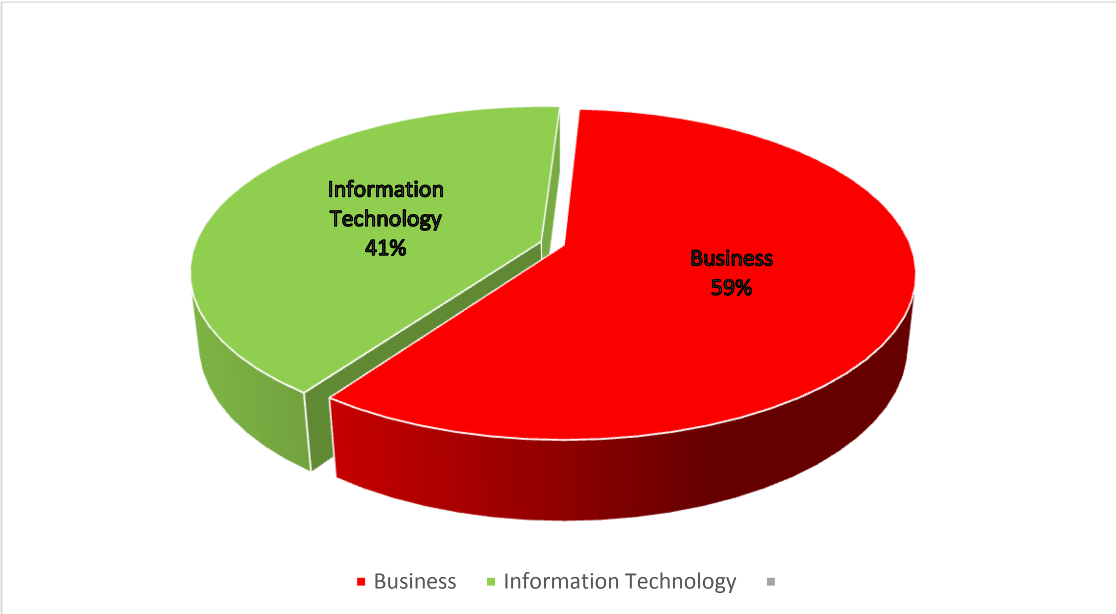


Fig 4.1: Area of Study

4.2.2 YEAR OF STUDY

The undergraduate students accounted for 80% of the students sampled, where year 1 students totaled 155 (31%), year 2 students 74 – 14.8% and year 3 students 171 (34.2%) as illustrated in Fig 4.2

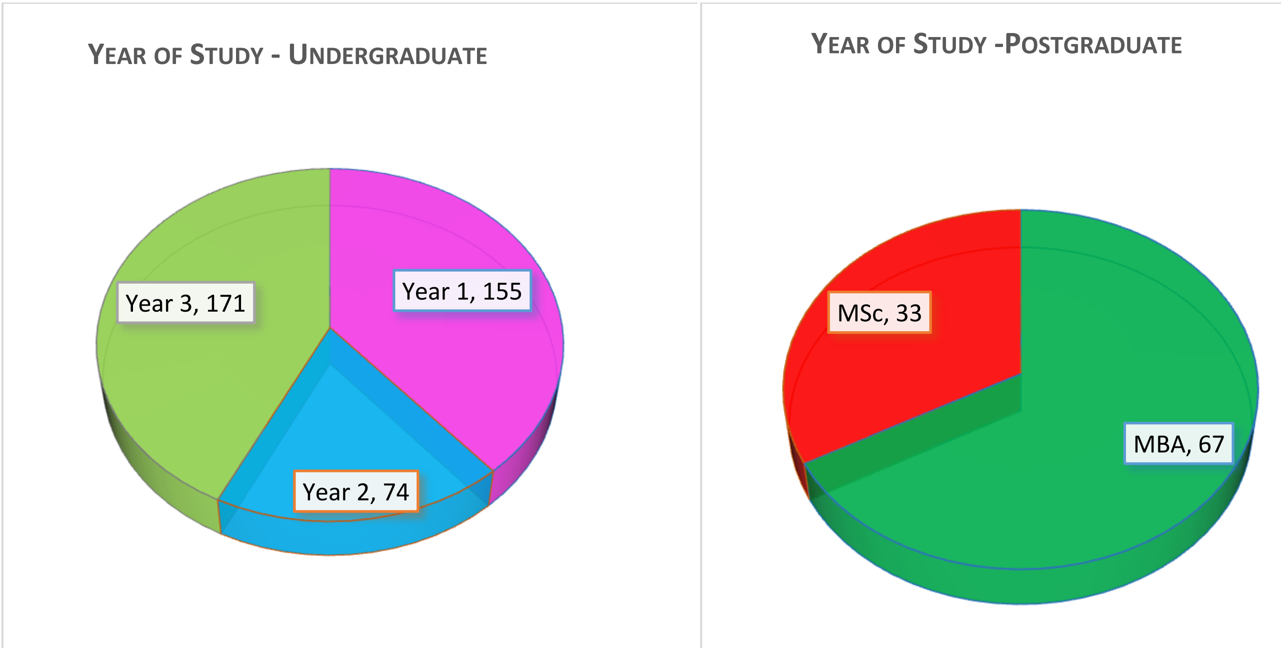


Fig 4.2: Year of Study – Undergraduate and Postgraduate

From the 31% of the year 1 students sampled ninety five (95) students were studying Business Management whilst sixty (60) students were studying *Information Technology*. Of the 14.8% of year 2 students, forty four (44) students were studying Business whilst thirty (30) students were studying Information Technology. Year 3 students accounted for 34.2% of the 80% of the students sampled. Eighty nine (89) were studying Business Management and eighty two (82) were studying Information Technology. At the MBA post graduate level100% was studying Business Management. Whilst all MSc post graduate students were studying Information Technology.

4.2.3 OPTION OF STUDY

Of the five hundred students surveyed, sixty three percent (63%) – three hundred and sixteen (316) students - attend the Saturday time option both at the undergraduate (two hundred and fifty (250) students) and the post graduate level (sixty six (66) students). The full time and part time options are at 18% and 19% respectively which account for ninety one (91) and ninety three (93) students sampled.

Post graduate courses are offered at part time and Saturday time options only. Fig 4.3 illustrates the number of students at the undergraduate courses as well as postgraduate levels.

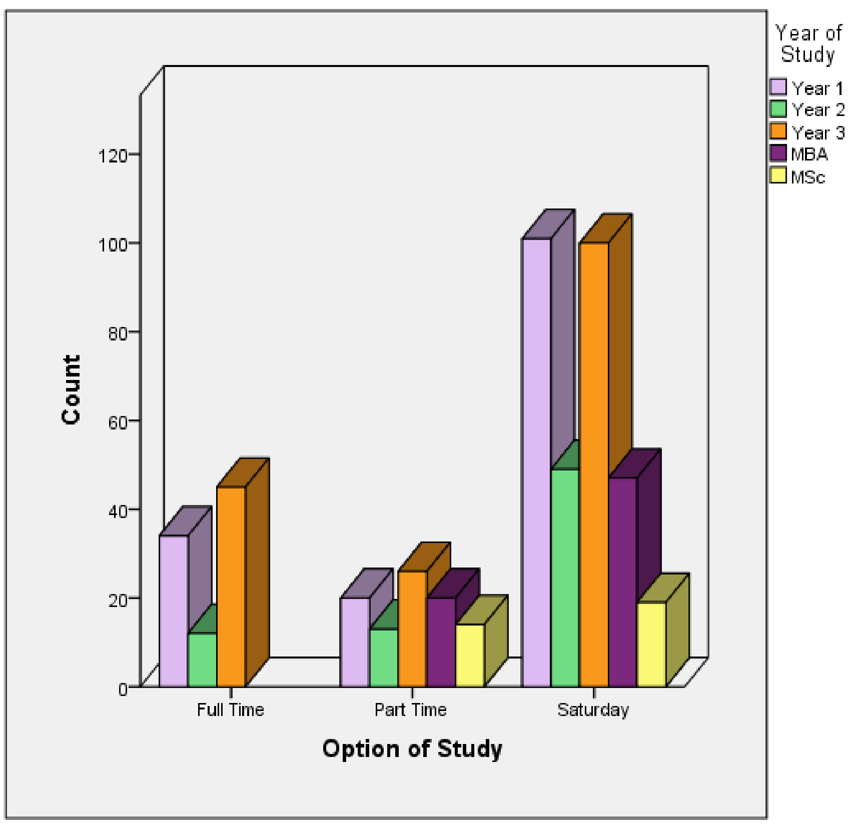


Fig 4.3: Time Option of Study vs Year of Study

4.2.4 AGE GROUP

Of the five hundred students surveyed18% (ninety two (92) students) were in the age group of 17 to 21 years while the highest number was one hundred and twenty eight (128) students which accounted for 26% was in the 22 to 26 year age group. In the age group of 27 to 31, 20% or one hundred and two (102) students fell into this category. With the next group of 32 to 36 years, they accounted for 19% of the population survey. 6% fell into the 37 to 41 age group (thirty (30) students) and thirty five (35) students or 7% were found to be within the 42 to 46 age group. 4% (twenty (20) students) were older than 47 years. As seen in the following pie chart

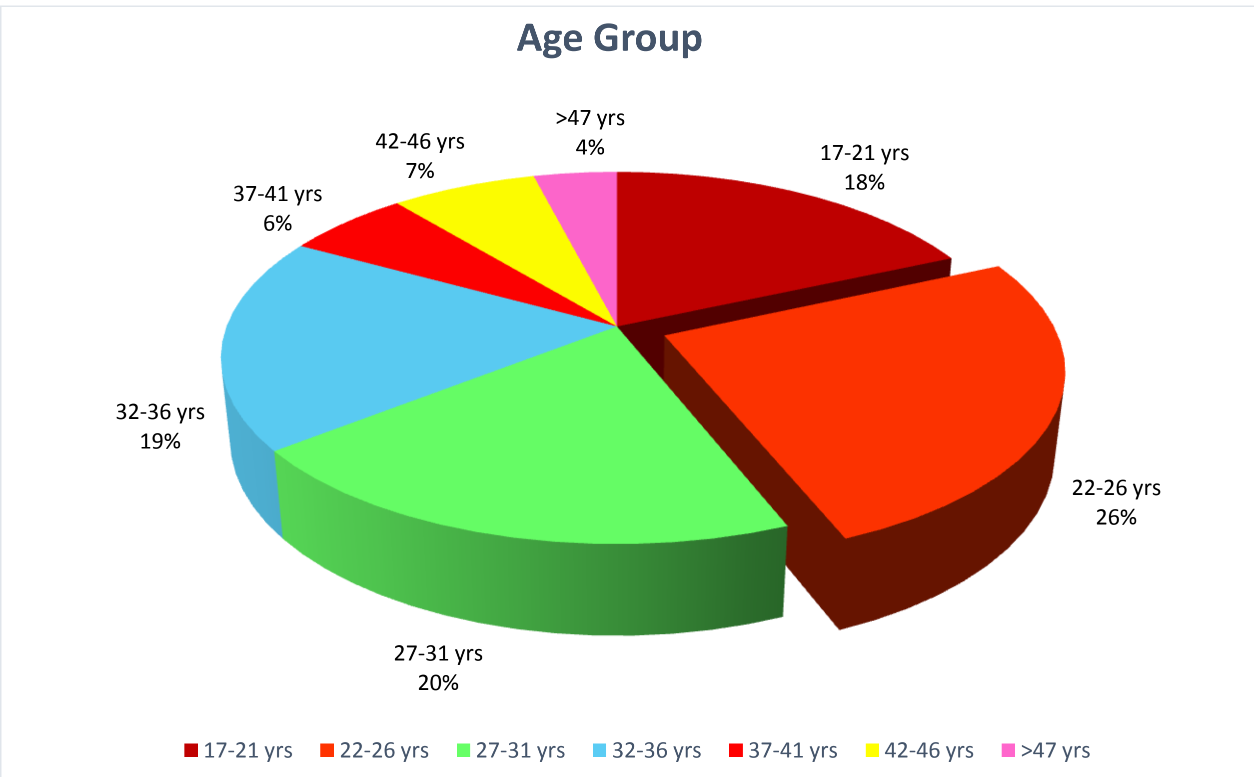


Fig 4.4: Age Group

4.2.5 IT SKILLS AT START OF STUDY TO PRESENT

When students were asked how they rate their IT skills at the start of their study, 70% of the students studying Business Management course indicated that their IT skill level was intermediate, with forty six (46) of the two hundred and ninety five students stating weak and forty one (41) students with strong IT skills. One person opted for no IT skills whatsoever as illustrated in Fig 4.5

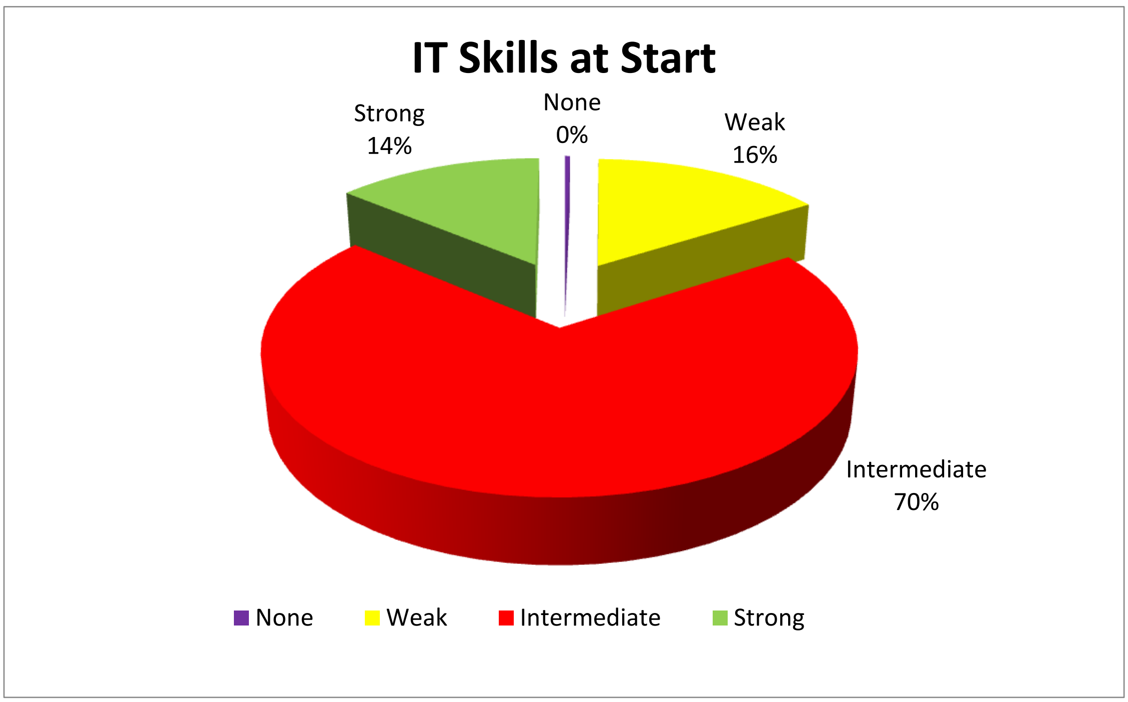


Fig 4.5: IT Skills at start of study – Business Management

Students studying Information Technology, IT skills at the start of the course six students indicated that they had no IT skills with forty five (45) students stating that their IT skills was weak . Seventy percent (70%) – a total of one hundred and twenty three (123) students of the two hundred and five students studying IT states that their IT skills at the commencement of their course at the School of Accounting and Management fell into the intermediate category as illustrated in Fig 11. It should be noted that 70% of the students studying Business also fell into the intermediate category. Fifteen percent (31 students) indicated that they possessed strong IT and Management was intermediate and fourteen percent indicated that their IT skills was strong at the start of their courses.

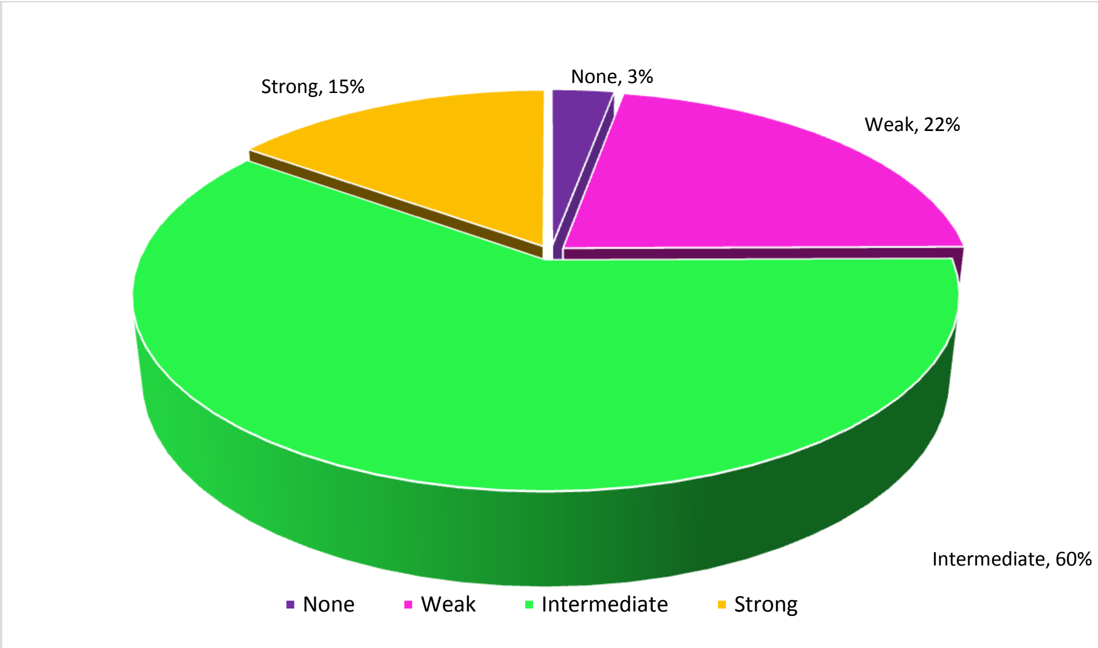


Fig 4.6: IT Skills at start of study – Information Technology

When Business Management students were asked what they thought of their IT skills at present when completing the questionnaire the number decreased from forty six (46) to twenty six (26) in the rating category of weak, the intermediate category there was a slight decrease from two hundred and seven (207) to two hundred and three (203) at present, whilst the category of strong IT skills showed an eight percent increase from 14% at the start of their course to 22% at the present time of the survey, as illustrated in Fig 4.7

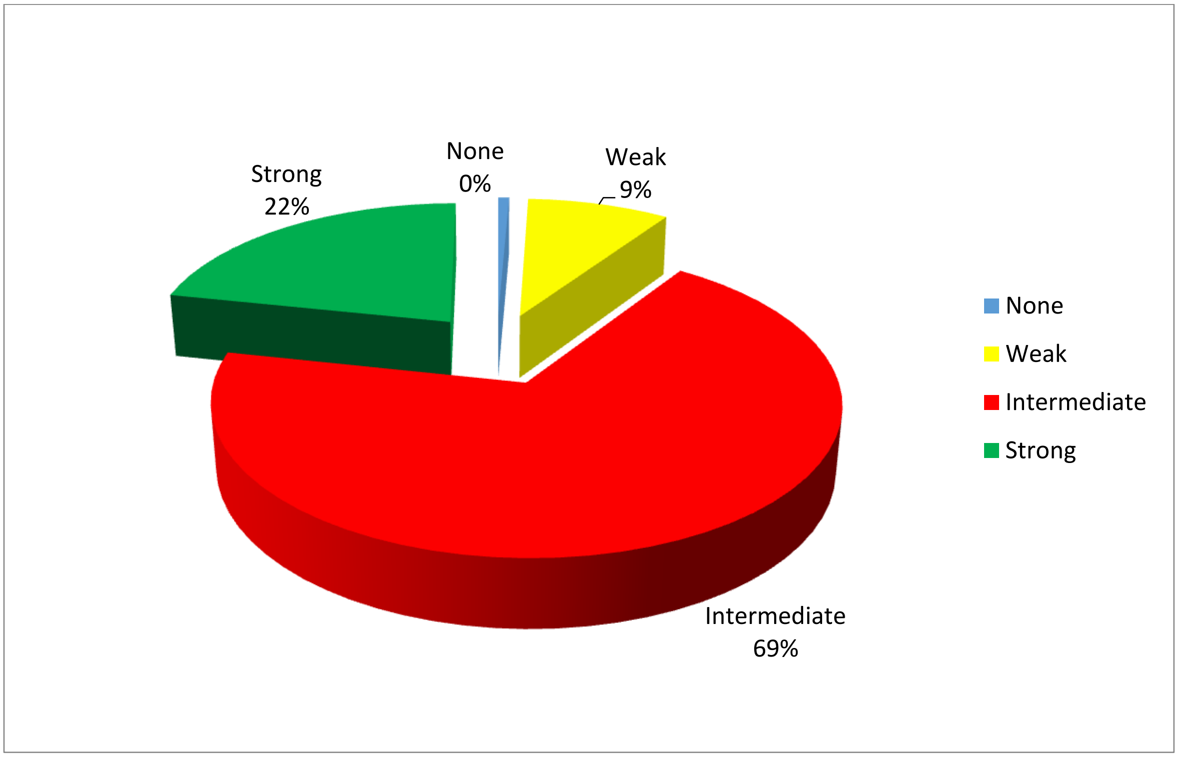


Fig 4.7: IT Skills at present – Business Management

When asked to comment on their skills at present the six students who previously indicated that they had no skills elevated from that category to one with skills. Students with weak IT skills decreased by seventeen percent (17%) from forty five at the commencement of their study to nine students at present. There was a four percent increase of the students who fell into the intermediate category and there was a significant increase of students with strong IT skills, increasing from thirty one to sixty four students as displayed in Fig 4.8.

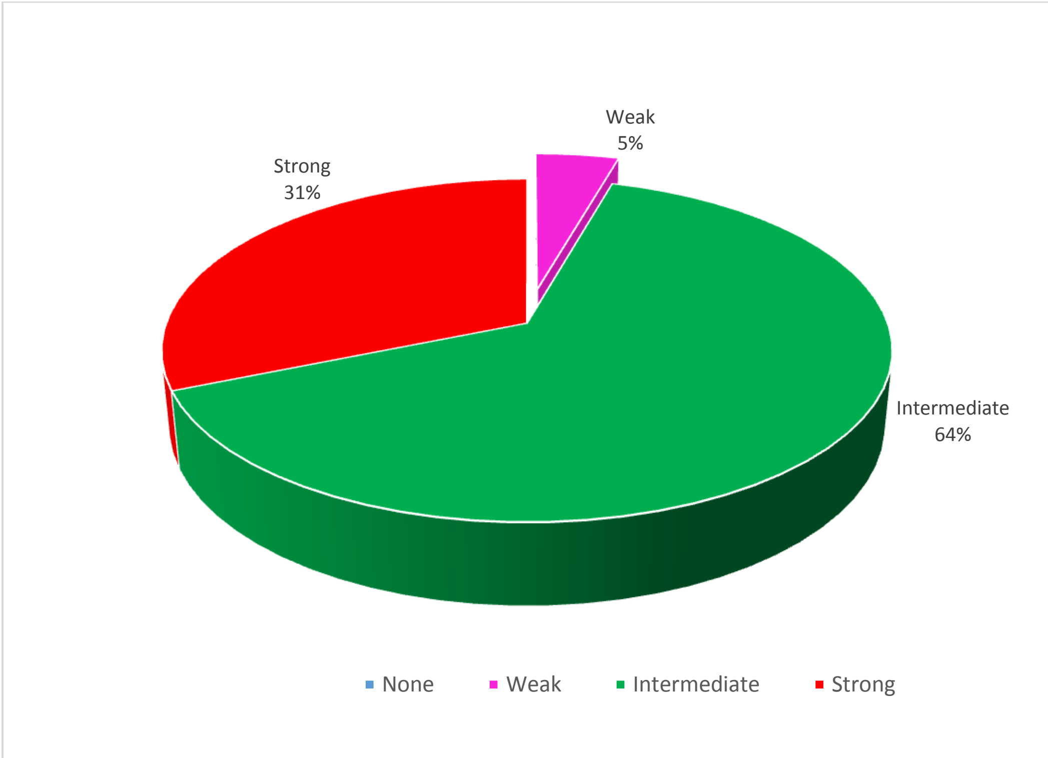


Fig 4.8: IT Skills at present - Information Technology

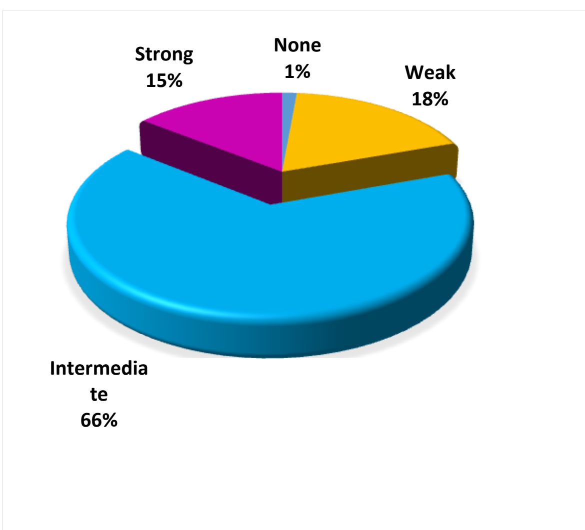


Fig 4.9: IT Skills at Start

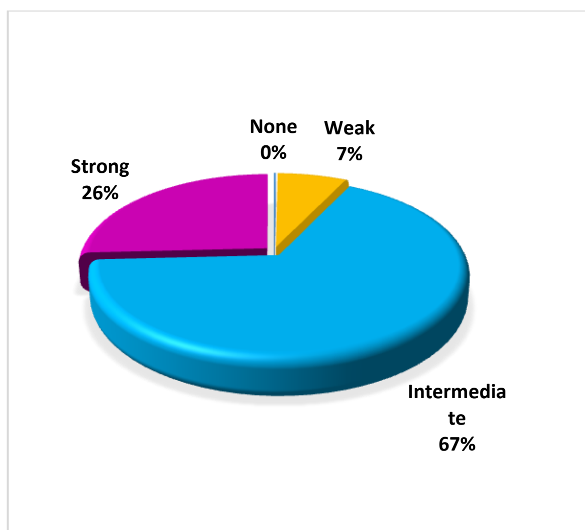


Fig 4.10: IT Skills at Present

Figs 4.9 and 4.10 illustrate the three categories of IT Skills at the start of the course. Fig 4.10 showed that the category of weak IT Skills decreased from the start to the present date of the survey. Also, the strong category of IT Skills also increased in both the Business Management and Information Technology courses.

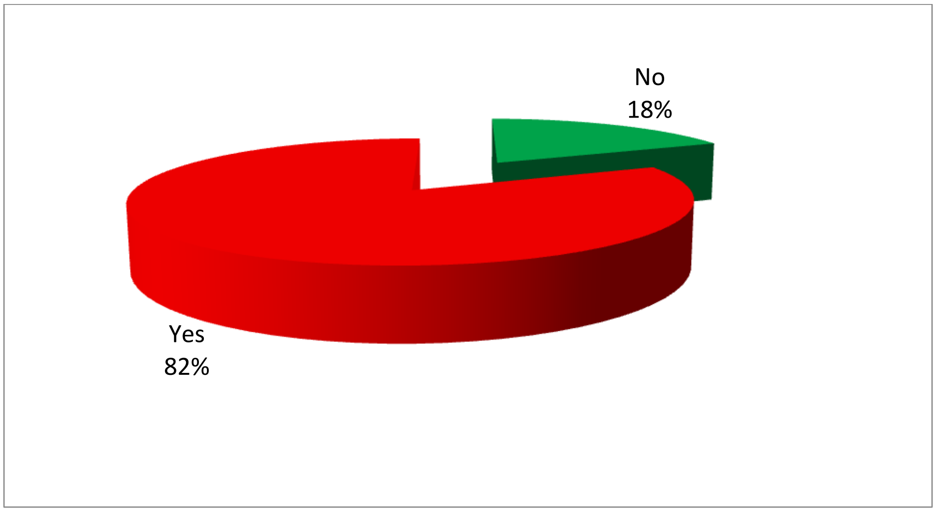


Fig 4.11: Improvement of IT Skills

When students of both Business Management and Information Technology courses were asked if they thought that their IT skills have improved since the commencement of their studies at School of Accounting and Management, eighty two percent (82%) of the five hundred students stated Yes whilst the remaining eighteen percent (18%) – ninety two (92) students – said no as illustrated in Fig 4.11.

With respect to Business Management students, two hundred and six (206) of the two hundred and ninety five (295) which accounted for seventy percent indicated that their IT skills had improved while the remaining thirty percent (30%) had a negative response. Unlike the Information Technology students, ninety eight (98%) of the two hundred and five students in the sample said that they saw improvements in their IT skills from the time of the commencement of their studies up to the present time, while two percent saw no improvement. This improvement can be attributed to the curriculum in the both the IT and Business Management courses are heavily dependent on the use of IT in classroom activities as well as continuous assessment.

4.3 SECTION 2: DOING AND WATCHING

Section 2 (Honey and Mumford (2000)) of this survey was designed to help gain an understanding of students' learning style so that an educator can incorporate the various learning styles into students' daily learning activities.

Pearson's chi-square test of independence was used to show the relationship between two categorical variables. This statistical method was used to assess the goodness of fit between a set of observed values and those expected theoretically. Further to this, Pearson's chi-square distribution along with the critical value and the p value allowed the researcher either to accept or reject the null hypothesis (H_0). The null hypothesis indicates that there is no observable difference in responses between the observed and the expected frequencies and also states that the two variables are independent of each other.

The two variables used for this test were Area of Study and Student Learning1: **SL1: Doing** - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical

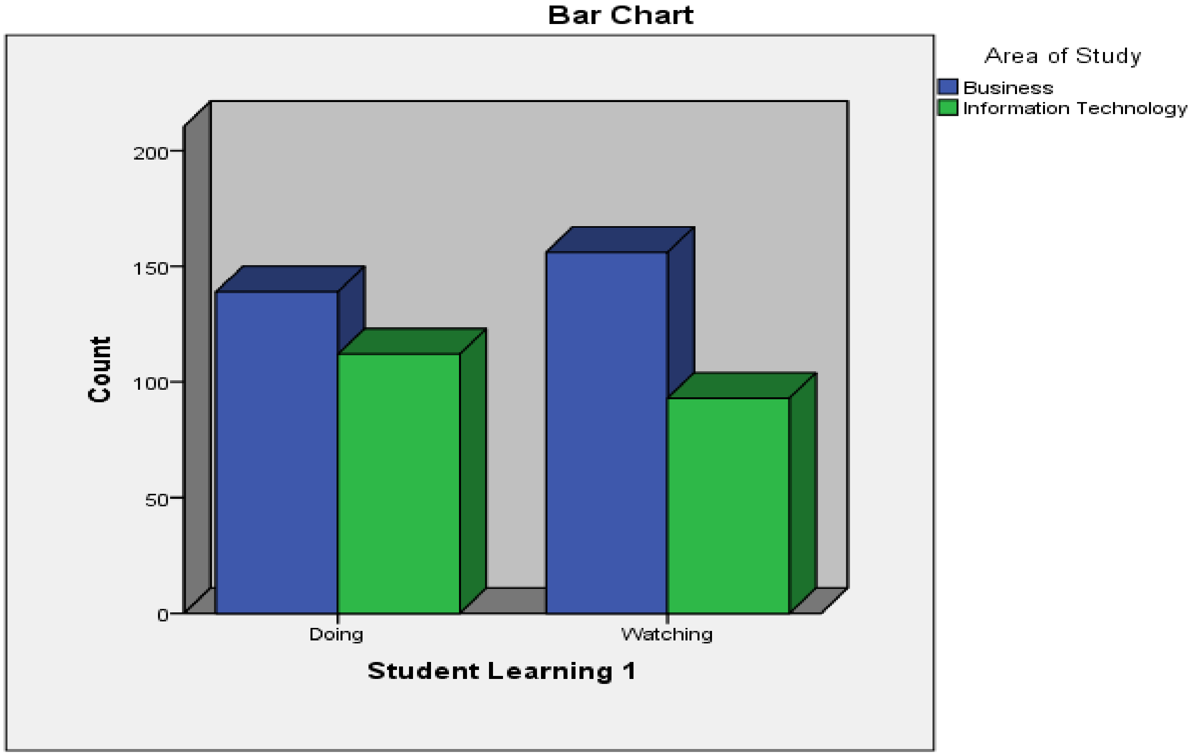


Fig 4.12: Area of Study vs SL1

In the Area of Study, of the five hundred students surveyed, overall two hundred and fifty one (251) students prefer Doing 50.2% which states that *'I often produce off-the-cuff ideas that at first might seem silly or half-baked*' to Watching with two hundred and forty nine students (249) or 49.8% which states that '*I am thorough and methodical*'. However, taking each course into account, the Business Management students prefer Watching with 52.9% to Doing with 47.1%. Students pursuing the Information Technology course prefer Doing with 54.6% to Watching with 45.4%.

			Student Learning 1		Total
			Doing	**Watching**	
Area of Study	**Business**	Count	**139**	**156**	**295**
		% within Area of Study	**47.1%**	**52.9%**	**100.0%**
	Information Technology	Count	**112**	**93**	**205**
		% within Area of Study	**54.6%**	**45.4%**	100.0%
Total		Count	**251**	**249**	**500**
		% within Area of Study	**50.2%**	**49.8%**	100.0%

Table 4.27: Area of Study vs SL1

The results of this cross tabulation gave the following:

$\chi^2(1) = 2.733$, $p = .098$; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Area of Study is not giving any observable difference for SL1. There is no significant margin to indicate that students prefer to have an experience (Doing) as opposed to reviewing an experience (Watching). According to Honey and Mumford's learning styles cycle, there is no clear balance whether students tend to be activists or reflectors on the processing continuum.

The two variables used in this test were Area of Study and Student Learning 2: **SL2: Doing** - I am normally the one who initiates conversations. **Watching** - I enjoy watching people.

			Student Learning 2		Total
			Doing	**Watching**	
Area of Study	**Business**	Count	**161**	**134**	**295**
		% within Area of Study	**54.6%**	**45.4%**	100.0%
	Information Technology	Count	**92**	**113**	**205**
		% within Area of Study	**44.9%**	**55.1%**	100.0%
Total		Count	**253**	**247**	**500**
		% within Area of Study	**50.6%**	**49.4%**	100.0%

Table 4.28: Area of Study vs SL 2

The results of this cross tabulation gave the following:

χ^2 (1) = 4.551, p =.033; H_0 = rejected

There was an observable difference in responses therefore the null hypothesis, H_0, has been rejected. This indicates that the Area of Study is giving an observable difference for SL2. There is no clear balance whether students tend to be activists or reflectors on the processing continuum

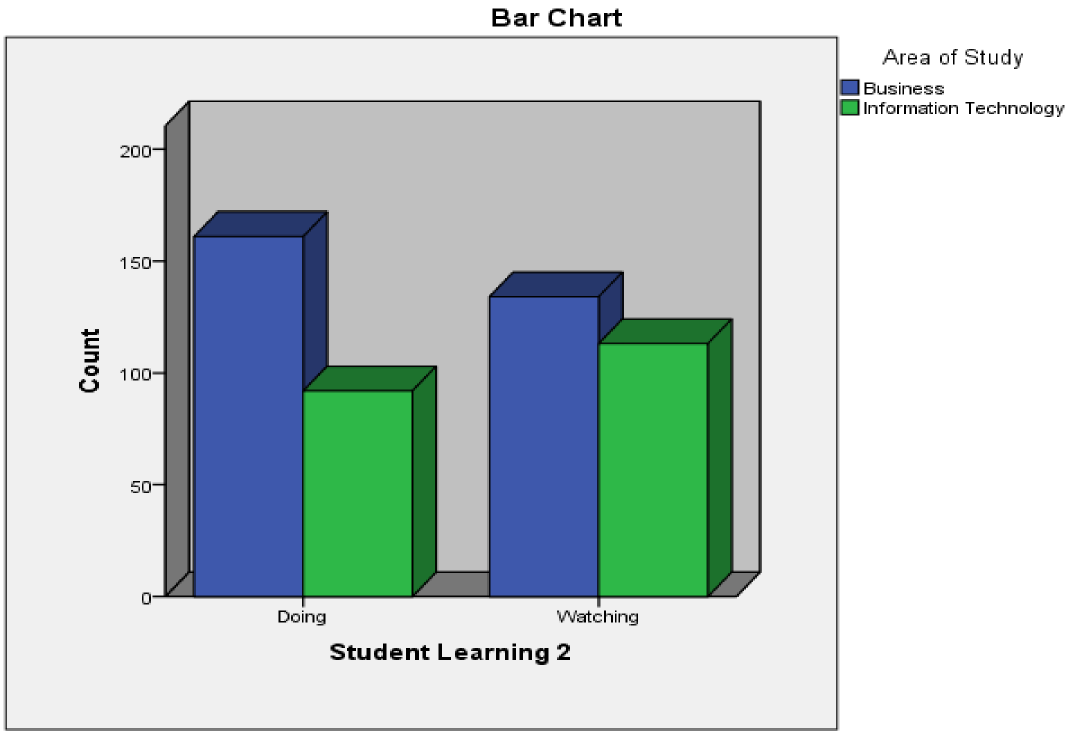


Fig 4.13: Area of Study vs SL2

In the Area of Study, of the five hundred students surveyed, overall two hundred and fifty three (253) students prefer Doing 50.6% which states that ***'****I am normally the one who initiates conversations'* to Watching with two hundred and forty seven students (247) or 49.4% which states that *'I enjoy watching people'*. Of the two hundred and ninety five (295) students enrolled in the Business Management course prefer Doing with 54.6% to Watching with 45.4%. Students pursuing the Information Technology course prefer Watching with 55.1% to Doing with 49.4%. According to Honey and Mumford's learning styles cycle, students tend to be activist rather than reflector on Kolb's processing continuum. However, the Information Technology students preferred reviewing their experience rather than having one whilst the Business Management Students preferred having an experience rather than reviewing it.

The two variables used in this test were Area of Study and Student Learning 3: **SL3: Doing** - I am flexible and open minded. **Watching** - I am careful and cautious.

The results of this cross tabulation gave the following:

$\chi^2(1) = 2.094$, $p = .148$; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Area of Study is not giving any observable difference for SL3.

			Student Learning 3		Total
			Doing	Watching	
Area of Study	Business	Count	**198**	**97**	**295**
		% within Area of Study	67.1%	32.9%	100.0%
	Information Technology	Count	**150**	**55**	**205**
		% within Area of Study	73.2%	26.8%	100.0%
Total		Count	**348**	**152**	**500**
		% within Area of Study	69.6%	30.4%	100.0%

Table 4.29: Area of Study vs SL3

In the Area of Study, of the five hundred students surveyed, overall three hundred and forty eight (348) students prefer Doing 69.6% which states that ***'****I am flexible and open minded'* to Watching with one hundred and fifty two students (152) or 30.4% which states that *'I am careful and cautious*'. Table 4.3 illustrates that of the two hundred and ninety five (295) students enrolled in the Business Management course prefer Doing with 67.1% to Watching with 32.9%. Of the two hundred and five (205) students pursuing the Information Technology course, they also prefer Doing with 73.2% to Watching with 26.8%. According to Honey and Mumford's learning styles cycle, students tend to be activist rather than reflector on the processing continuum. Both the Information Technology and the Business Management Students prefer to have an experience (Doing) - 69.6% as opposed to reviewing an experience (Watching) – 30.4%. According to Honey and Mumford's learning styles cycle, students tend to be activist rather than reflector on Kolb's processing continuum.

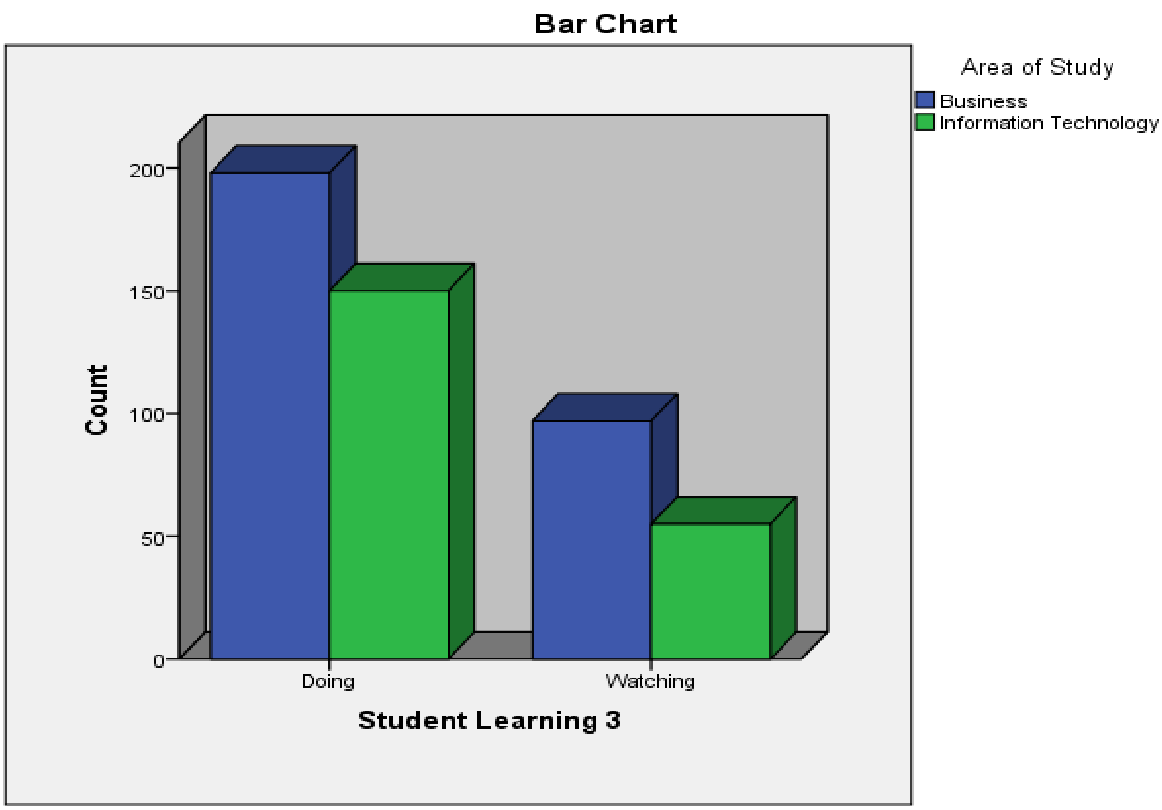


Fig 4.14: Area of Study vs SL3

The two variables used in this test were Area of Study and Student Learning 4: **SL4: Doing** - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it.

The results of this cross tabulation gave the following:

$\chi^2(1) = 2.597$, $p = 0.107$; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Area of Study is not giving any observable difference for SL4.

Area of Study * Student Learning 4

			Student Learning 4		Total
			Doing	Watching	
Area of Study	Business	Count	**154**	**141**	**295**
		% within Area of Study	52.2%	47.8%	100.0%
	Information Technology	Count	**92**	**113**	**205**
		% within Area of Study	44.9%	55.1%	100.0%
Total		Count	**246**	**254**	**500**
		% within Area of Study	49.2%	50.8%	100.0%

Table 4.30: Area of Study vs SL4

In the Area of Study, of the five hundred students surveyed, overall two hundred and forty six (246) students prefer Doing 49.2% which states that *'I like to try new and different things without too much preparation'* to Watching with two hundred and fifty four students (254) or 50.8% which states that *'I investigate a new topic or process in depth before trying it'*. Table 4.4 illustrates that of the two hundred and ninety five (295) students enrolled in the Business Management course prefer Doing with 52.2% to Watching with 47.8%. Of the two hundred and five (205) students pursuing the Information Technology course 55.1% prefer Watching to 44.9% Doing. The Business Management Students prefer to have an experience (Doing) as opposed to reviewing an experience (Watching) – 30.4%. Whilst the Information Technology students prefer review the experience to having the experience. According to Honey and Mumford's learning styles cycle, students in Business Management tend to be activist whilst students in Information Technology course tend to be a reflector on Kolb's processing continuum.

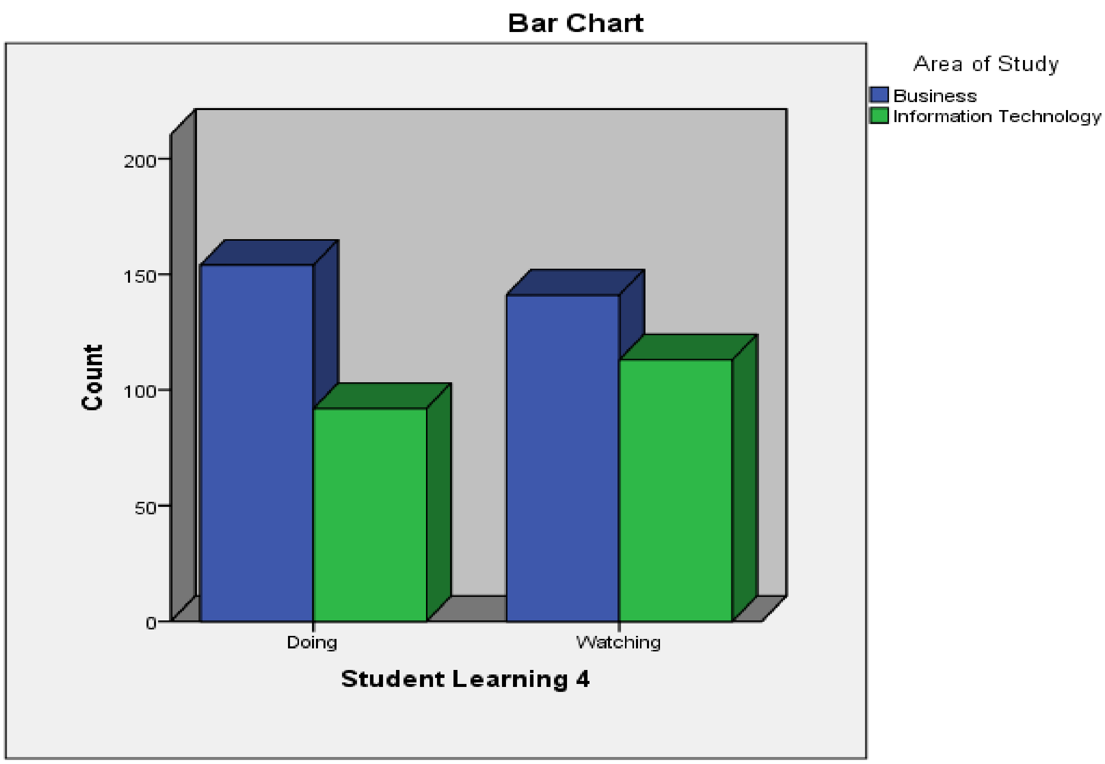


Fig 4.15: Area of Study vs SL4

The two variables used in this test were Area of Study and Student Learning 5: **SL5: Doing** - I am happy to have a go at new things. **Watching** - I draw up lists up possible courses of actions when starting a new project.

The results of this cross tabulation gave the following:

$\chi^2(1) = 1.311$, $p = 0.252$; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Area of Study is not giving any observable difference for SL5.

			Student Learning 5		Total
			Doing	Watching	
Area of Study	Business	Count	**175**	**120**	**295**
		% within Area of Study	59.3%	40.7%	100.0%
	Information Technology	Count	**132**	**73**	**205**
		% within Area of Study	64.4%	35.6%	100.0%
Total		Count	**307**	**193**	**500**
		% within Area of Study	61.4%	38.6%	100.0%

Table4. 31: Area of Study * SL 5

In the Area of Study, of the five hundred students surveyed, overall three hundred and seven (307) students prefer Doing 61.4% which states that ***'****I am happy to have a go at new things'* to Watching with one hundred and ninety three students (193) or 38.6% which states that 'I draw up lists up possible courses of actions when starting a new project.' Table 4.5 illustrates that of the two hundred and ninety five (295) students enrolled in the Business Management course prefer Doing with 59.3% to Watching with 40.7%. Of the two hundred and five (205) students pursuing the Information Technology course, students also prefer Doing with 64.4% to Watching with 35.6%. According to Honey and Mumford's learning styles cycle, students tend to be activist (having an experience) rather than reflector (reviewing an experience) on the Kolb's processing continuum. Both the Information Technology and the Business Management Students prefer to have an experience (Doing)–61.4% as opposed to reviewing an experience (Watching) – 38.6%.

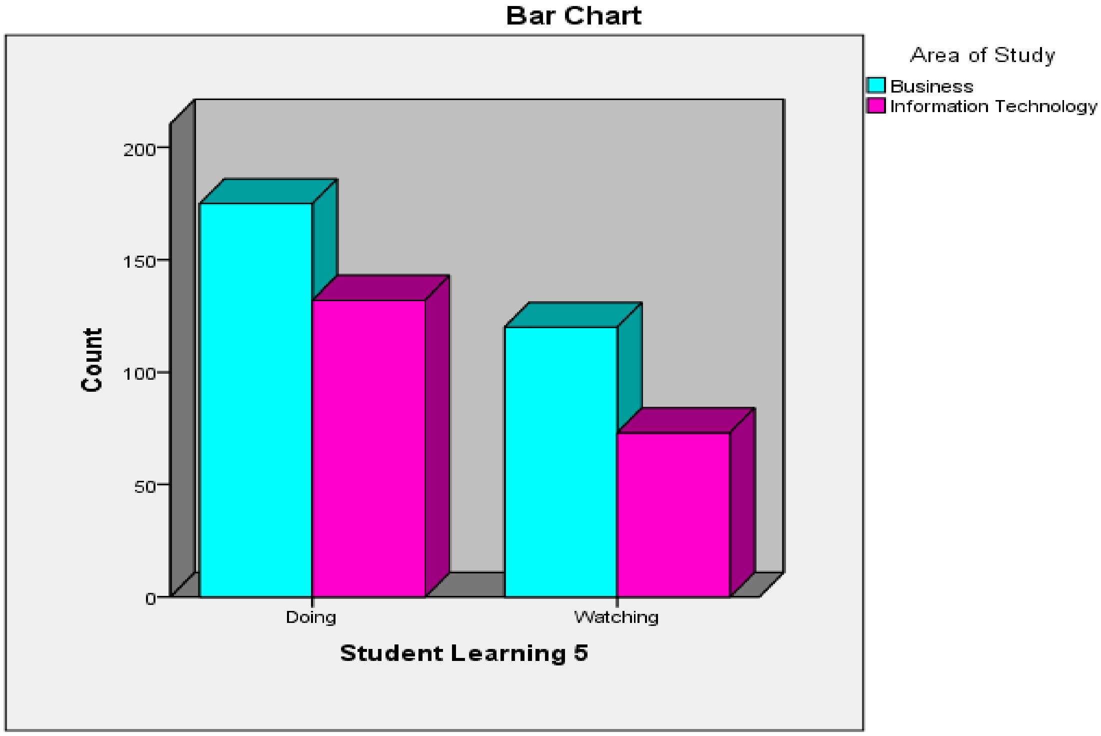


Fig 4.16: Area of Study vs SL5

The two variables used in this test were Area of Study and Student Learning 6: **SL6: Doing** - I like to get involved and to participate. **Watching** - I like to read and observe

The results of this cross tabulation gave the following:

$\chi^2(1) = 2.590$, p =0.108; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Area of Study is not giving any observable difference for SL6.

			Student Learning 6		Total
			Doing	Watching	
Area of Study	Business	Count	**188**	**107**	**295**
		% within Area of Study	63.7%	36.3%	100.0%
	Information Technology	Count	**116**	**89**	**205**
		% within Area of Study	56.6%	43.4%	100.0%
Total		Count	**304**	**196**	**500**
		% within Area of Study	60.8%	39.2%	100.0%

Table 4.32: Area of Study * SL 6

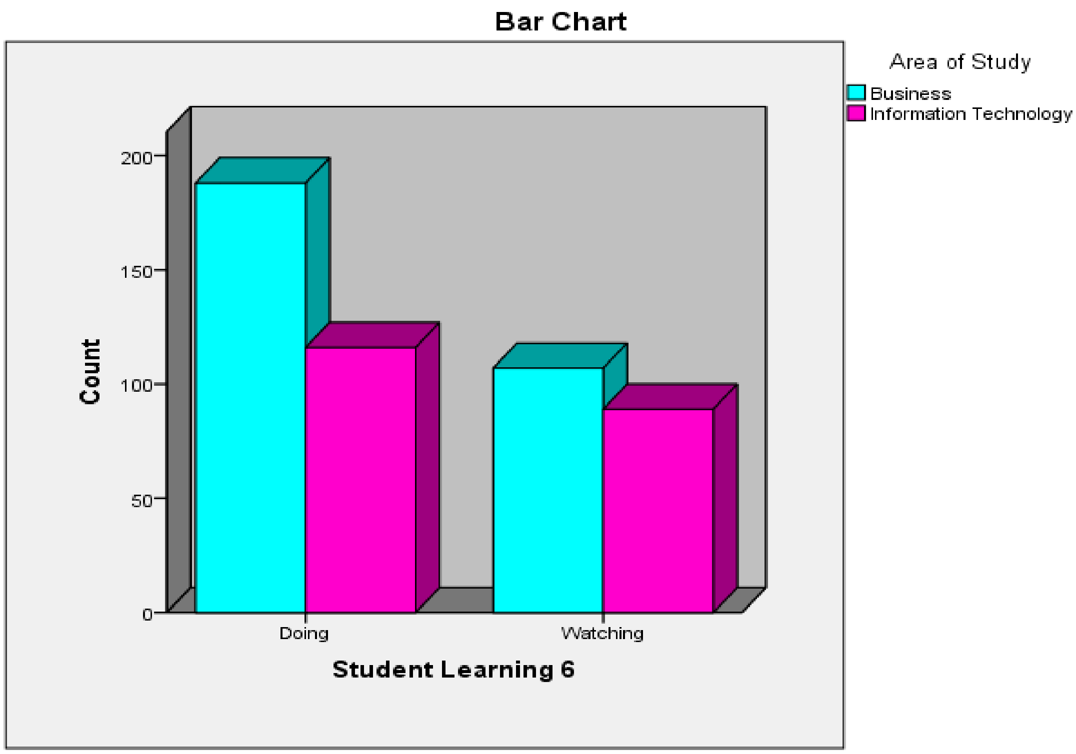


Fig 4.17: Area of Study vs SL6

In the Area of Study, of the five hundred students surveyed, overall three hundred and four (304) students prefer Doing 60.8% which states *that 'I like to get involved and to participate'* to Watching with one hundred and ninety six students (196) or 39.2% which states that 'I like to read and observe'. Table 4.6 illustrates that of the two hundred and ninety five (295) students enrolled in the Business Management course prefer Doing with 63.7% to Watching with 36.3%. Of the two hundred and five (205) students pursuing the Information Technology course, they also prefer Doing with 56.6% to Watching with 43.4%. According to Honey and Mumford's learning styles cycle, students tend to be activist (having an experience) rather than reflector (reviewing an experience) on the Kolb's processing continuum. Both the Information Technology and the Business Management Students prefer to have an experience (Doing) – 60.8% as opposed to reviewing an experience (Watching) – 39.2%.

The two variables used in this test were Area of Study and Student Learning 7: **SL7: Doing** - I am loud and outgoing. **Watching** - I am quiet and somewhat shy.

The results of this cross tabulation gave the following:

$\chi^2(1) = 5.642$, $p = 0.018$; H_0 = rejected

There was observable difference in responses therefore the null hypothesis, H_0, has been rejected. This indicates that the Area of Study is giving an observable difference for SL7.

			Student Learning 7		Total
			Doing	Watching	
Area of Study	Business	Count	**132**	**163**	**295**
		% within Area of Study	44.7%	55.3%	100.0%
	Information Technology	Count	**70**	**135**	**205**
		% within Area of Study	34.1%	65.9%	100.0%
Total		Count	**202**	**298**	**500**
		% within Area of Study	40.4%	59.6%	100.0%

Table 4.33: Area of Study vs SL 7

In the Area of Study, of the five hundred students surveyed, overall two hundred and two (246) students prefer Doing 40.4% which states that *'I am loud and outgoing'* whilst two hundred and ninety eight students (298) or 59.6% preferred Watching with which states that *'I am quiet and somewhat shy'*. Table 4.7 illustrates that of the two hundred and ninety five (295) students enrolled in the Business Management course prefer Watching with 55.3% to Doing with 44.7%. Of the two hundred and five (205) students pursuing the Information Technology course, 65.9% prefer Watching to Doing with 34.1%. Both the Information Technology and Business Management Students prefer to reviewing an experience (Watching) - 59.6% as opposed to have an experience (Doing) – 40.4%. Whilst the Information Technology students prefer review the experience to having the experience. According to Honey and Mumford's learning styles cycle, students in Business Management and Information Technology course tend to be reflector on Kolb's processing continuum.

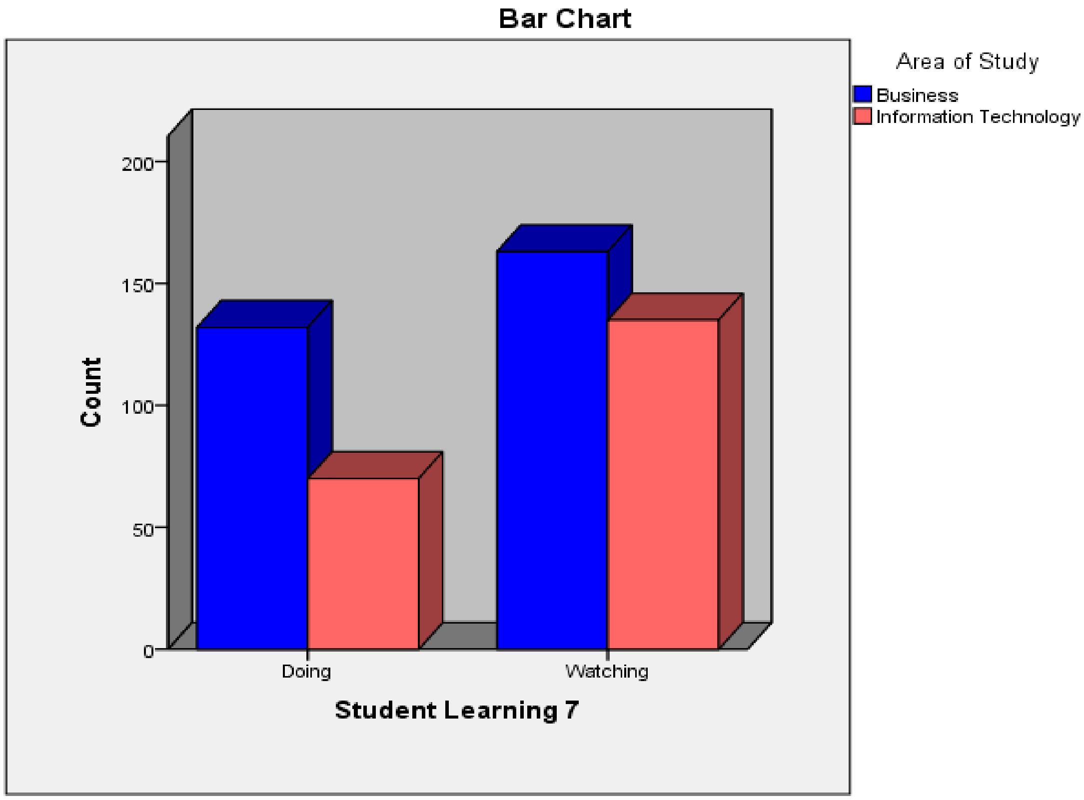


Fig 4.18: Area of Study vs SL7

The two variables used in this test were Area of Study and Student Learning 8:

SL8: Doing - I make quick and bold decisions. **Watching** - I make cautious and logical decisions

The results of this cross tabulation gave the following:

$\chi^2(1) = 3.280$, $p = 0.070$; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Area of Study is not giving any observable difference for SL8.

			Student Learning 8		Total
			Doing	Watching	
Area of Study	Business	Count	**75**	**220**	**295**
		% within Area of Study	25.4%	74.6%	100.0%
	Information Technology	Count	**38**	**167**	**205**
		% within Area of Study	18.5%	81.5%	100.0%
Total		Count	**113**	**387**	**500**
		% within Area of Study	22.6%	77.4%	100.0%

Table 4.34: Area of Study vs Sl 8

In the Area of Study, of the five hundred students surveyed, overall one hundred and thirteen (113) students prefer Doing 22.6% which states that *'I make quick and bold decisions'* whilst three hundred and eighty seven students (387) or 77.4% preferred Watching which states that *'I make cautious and logical decision'.* Table 4.8 illustrates that of the two hundred and ninety five (295) students enrolled in the Business Management course prefer Watching with 74.6% to Doing with 25.4%. Of the two hundred and five (205) students pursuing the Information Technology course, 81.5% prefer Watching to Doing with 18.5%. Both the Information Technology and Business Management Students prefer to reviewing an experience (Watching) - 59.6% as opposed to have an experience (Doing) – 40.4%. Whilst the Information Technology students prefer review the experience to having the experience. According to Honey and Mumford's learning styles cycle, students in Business Management and Information Technology course tend to be reflector rather than activist on Kolb's processing continuum.

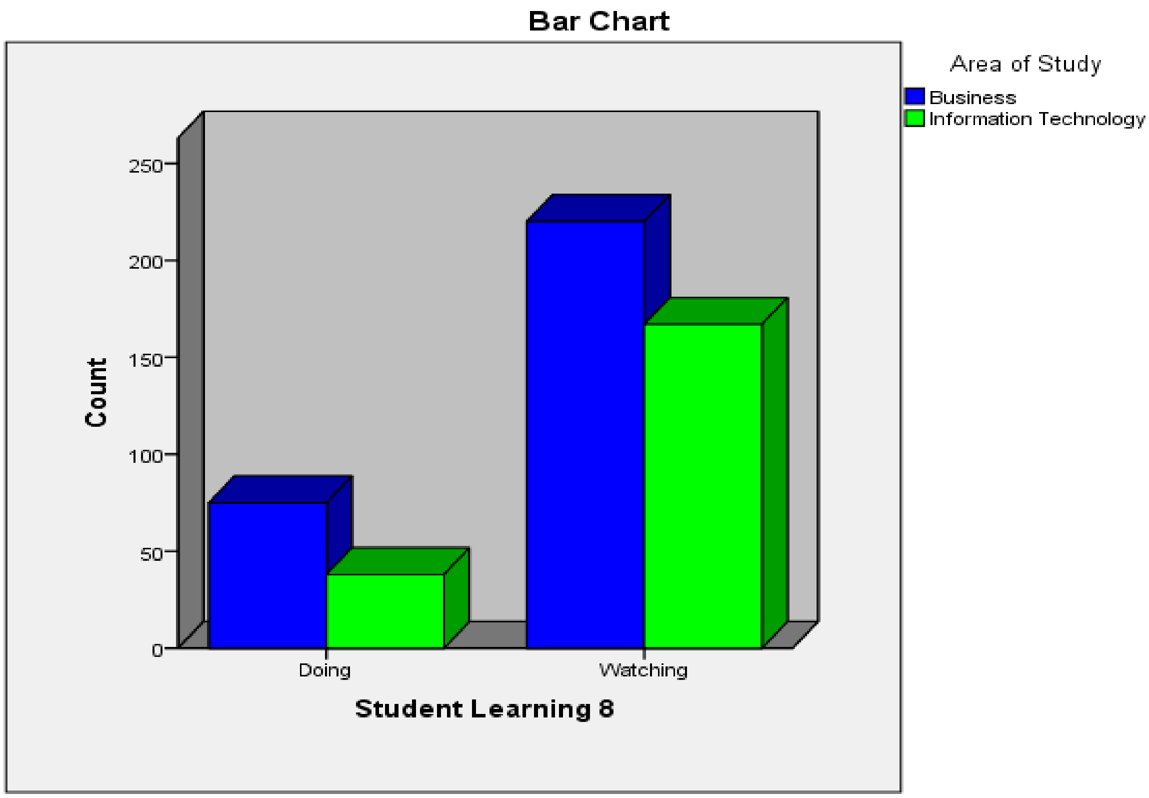


Fig 4.19: Area of Study vs SL8

The two variables used in this test were Area of Study and Student Learning 9: **SL9: Doing** - I speak fast, while thinking. **Watching** - I speak slowly, after thinking

The results of this cross tabulation gave the following:

$\chi^2(1) = 0.286$, $p = 0.593$; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Area of Study is not giving any observable difference for SL9.

			Student Learning 9		Total
			Doing	**Watching**	
Area of Study	**Business**	Count	**164**	**131**	**295**
		% within Area of Study	55.6%	44.4%	100.0%
	Information Technology	Count	**109**	**96**	**205**
		% within Area of Study	53.2%	46.8%	100.0%
Total		Count	**273**	**227**	**500**
		% within Area of Study	54.6%	45.4%	100.0%

Table 4.9: Area of Study vs SL 9

In the Area of Study, of the five hundred students surveyed, overall two hundred and seventy three (273) students prefer Doing 54.6% which states *that 'I speak fast, while thinking'* to Watching with two hundred and twenty seven students (227) or 45.4% which states that *'I speak slowly, after thinking'.* Table 4.9 illustrates that of the two hundred and ninety five (295) students enrolled in the Business Management course prefer Doing with 55.6% to Watching with 44.4%. Of the two hundred and five (205) students pursuing the Information Technology course, they also prefer Doing with 53.2% to Watching with 46.8%. As seen in Fig 19 – Honey and Mumford's learning styles cycle, students tend to be activist (having an experience) rather than reflector (reviewing an experience) on the Kolb's processing continuum. Both the Information Technology and the Business Management Students prefer to have an experience (Doing) – 54.6% as opposed to reviewing an experience (Watching) – 45.4%.

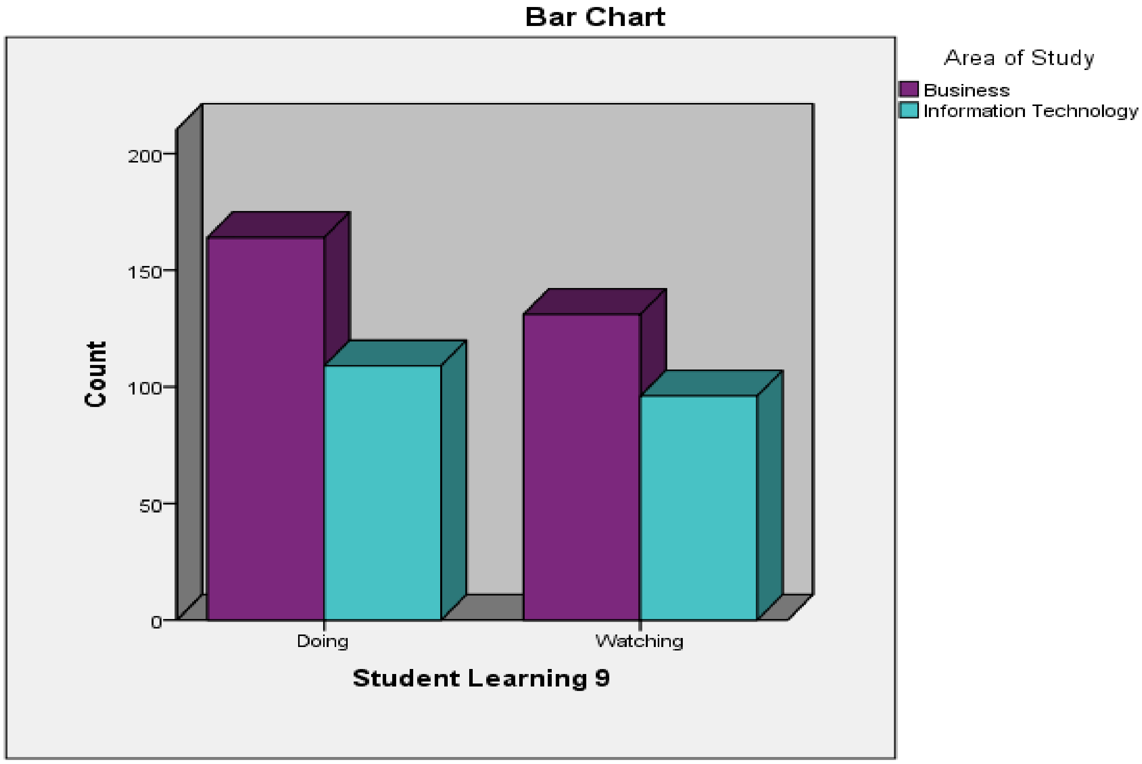


Fig 4.20: Area of Study vs SL9

The two variables used for this test were Year of Study and Student Learning1: **SL1: Doing** - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical.

There was an observable difference in responses therefore the null hypothesis, H_0, has been rejected.

χ^2 (4) = 13.791, p =0.008; H_0 = rejected

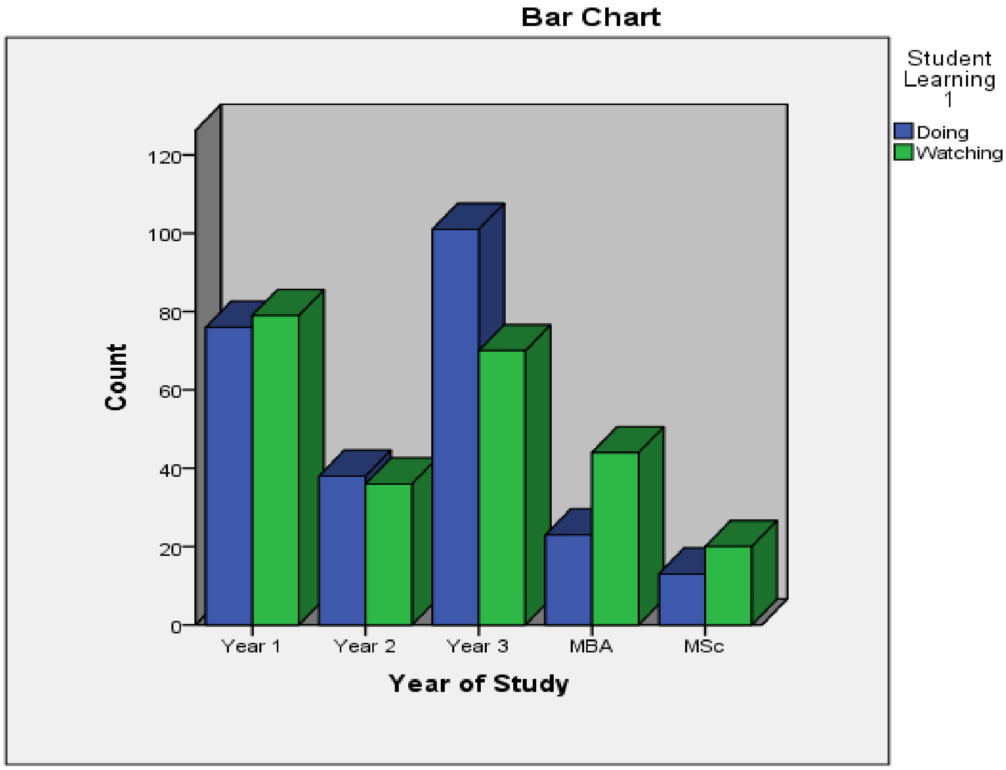


Fig 4.21: Year of Study and SL1

In the survey conducted 50.2% of students were SL1 (**Doing** - I often produce off-the-cuff ideas that at first might seem silly or half-baked thinking whilst 49.8% were feeling **Watching** - I am thorough and methodical) at the present time of their study.

			Student Learning 1		Total
			Doing	Watching	
Year of Study	**Year 1**	Count	**76**	**79**	**155**
		% within Year of Study	49.0%	51.0%	100.0%
	Year 2	Count	**38**	**36**	**74**
		% within Year of Study	51.4%	48.6%	100.0%
	Year 3	Count	**101**	**70**	**171**
		% within Year of Study	59.1%	40.9%	100.0%
	MBA	Count	**23**	**44**	**67**
		% within Year of Study	34.3%	65.7%	100.0%
	MSc	Count	**13**	**20**	**33**
		% within Year of Study	39.4%	60.6%	100.0%
Total		Count	**251**	**249**	**500**
		% within Year of Study	50.2%	49.8%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.791[a]	4	.008
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 16.43.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.166	.008
	Cramer's V	.166	.008
N of Valid Cases		500	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.35: Year of Study * Student Learning 1

In the Year of Study, of the five hundred students surveyed, overall two hundred and fifty one (251) students prefer Doing 50.2% which states *that* **‘**I often produce off-the-cuff ideas that at first might seem silly or half-baked’ to Watching with two hundred and forty nine students (249) or 49.8% which states that *‘I am thorough and methodical’.* Table 4.10 illustrates that of the one hundred and fifty five (155) students enrolled in Year 1 (Business Management and Information Technology courses) prefer Watching with 51.0% to Doing with 49.0%. Of the seventy four (74) students in Year 2 degree courses, they prefer Doing with 51.4% to Watching with 48.6%. Of the one hundred and seventy one (171) students in the Year 3 degree courses, they prefer Doing with 59.1% to Watching with 40.9%. Of the sixty seven (67) students in MBA post graduate course, they prefer Watching with 65.7% to Doing with 34.3%. Of the thirty three (33) students in MSc post graduate course, they also prefer Watching with 60.6% to Doing with 39.4% According to Honey and Mumford's learning styles cycle, overall the students tend to be activist (having an experience) rather than reflector (reviewing an experience) on the Kolb's processing continuum. Students at Year 2 and Year 3 prefer to review an experience rather than having an experience. Only the Year1 students, the inverse was true. Also, from the results in Table 10, students at post graduate level also preferred reviewing the experience (reflector) as opposed to having an experience (activist).

The two variables used in this test were Year of Study and Student Learning 2: **Student Learning 2 (SL2): Doing** - I am normally the one who initiates conversations. **Watching** - I enjoy watching people.

The results of this cross tabulation gave the following:

χ^2 (4) =5.703, p =0.222; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Year of Study is not giving any observable difference for SL2.

			Student Learning 2		Total
			Doing	Watching	
Year of Study	Year 1	Count	**87**	**68**	**155**
		% within Year of Study	56.1%	43.9%	100.0%
	Year 2	Count	**42**	**32**	**74**
		% within Year of Study	56.8%	43.2%	100.0%
	Year 3	Count	**77**	**94**	**171**
		% within Year of Study	45.0%	55.0%	100.0%
	MBA	Count	**31**	**36**	**67**
		% within Year of Study	46.3%	53.7%	100.0%
	MSc	Count	**16**	**17**	**33**
		% within Year of Study	48.5%	51.5%	100.0%
Total		Count	**253**	**247**	**500**
		% within Year of Study	50.6%	49.4%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.703[a]	4	.222
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 16.30.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.107	.222
	Cramer's V	.107	.222
N of Valid Cases		500	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.36: Year of Study * Student Learning 2

In the Year of Study, of the five hundred students surveyed, overall two hundred and fifty three (253) students prefer Doing 50.6% which states *that 'I am normally the one who initiates conversations'* to Watching with two hundred and forty seven students (249) or 49.4% which states that 'I enjoy watching people. Table 4.11 illustrates that of the one hundred and fifty five (155) students enrolled in Year 1 (Business Management and Information Technology courses) prefer Doing with 56.1% to Watching with 43.9%. Of the seventy four (74) students in Year 2 degree courses, they prefer Doing with 56.8% to Watching with 43.2%. Of the one hundred and seventy one (171) students in the Year 3 degree courses, they prefer Watching with 55% to Doing with 45%. Of the sixty seven (67) students in MBA post graduate course, they prefer Watching with 53.7% to Doing with 46.3%. Of the thirty three (33) students in MSc post graduate course, there is no significant margin to indicate that students prefer to have an experience (Doing) as opposed to reviewing an experience (Watching). According to Honey and Mumford's learning styles cycle, overall the students tend to be activist (having an experience) rather than reflector (reviewing an experience) on the Kolb's processing continuum. Students in Year 1 and Year 3 prefer to have an experience rather than reviewing an experience. With the Year3 students, the inverse was true. Also, from the results in Table 4.11, students at post graduate level preferred reviewing the experience (reflector) as opposed to having an experience (activist) as illustrated in Fig 4.22

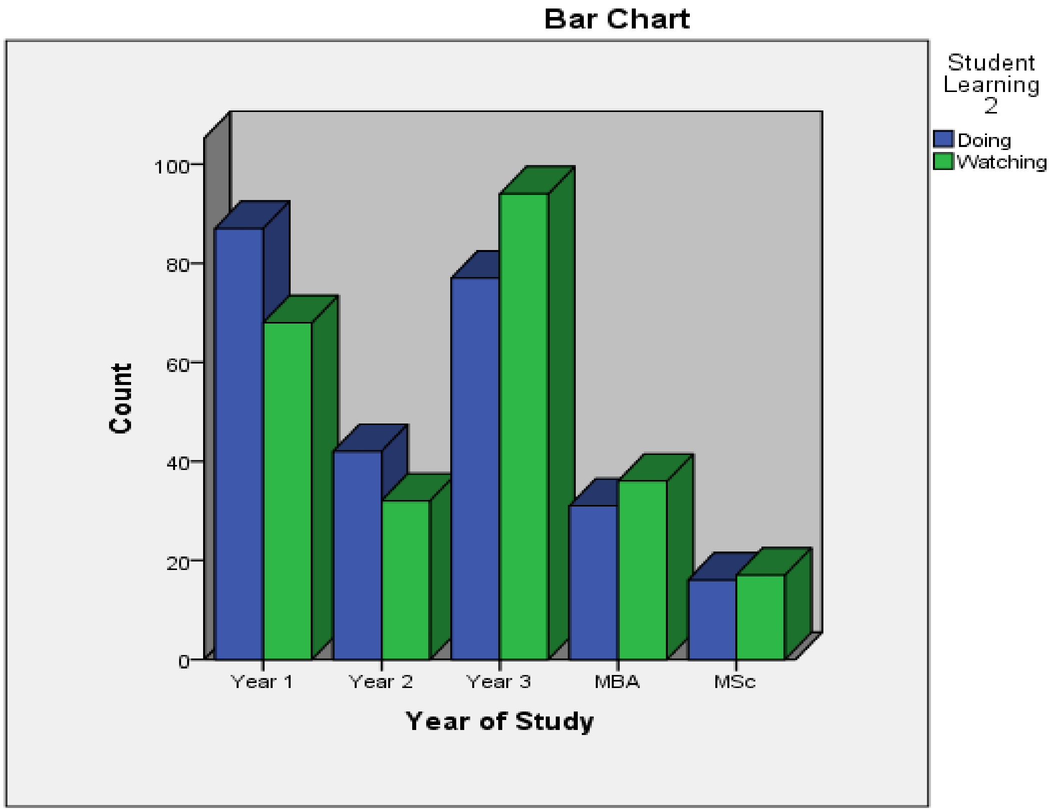


Fig 4.22: Year of Study and SL2

The two variables used in this test were Year of Study and Student Learning 3: **Student Learning 3 (SL3): Doing** - I am flexible and open minded. **Watching** - I am careful and cautious.

The results of this cross tabulation gave the following:

χ^2 (4) = 1.620, p =0.805; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Year of Study is not giving any observable difference for SL3.

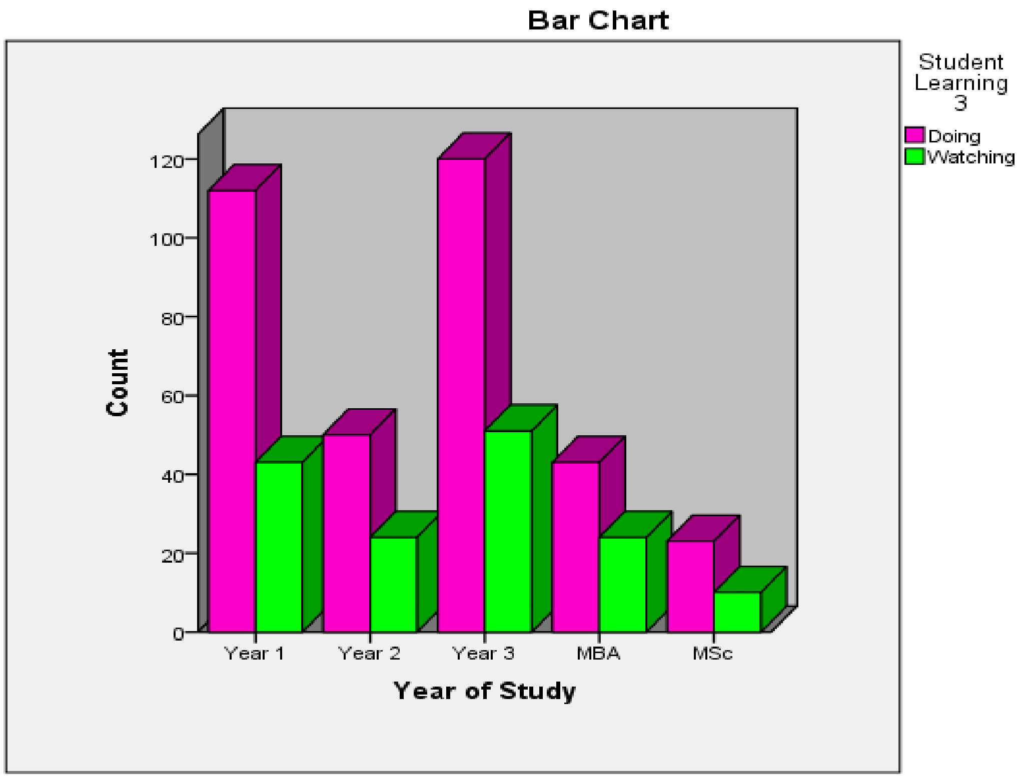


Fig 4.23: Year of Study and SL3

			Year of Study					Total
			Year 1	Year 2	Year 3	MBA	MSc	
Student Learning 3	Doing	Count	112	50	120	43	23	**348**
		Expected Count	107.9	51.5	119.0	46.6	23.0	**348.0**
	Watching	Count	43	24	51	24	10	**152**
		Expected Count	47.1	22.5	52.0	20.4	10.0	**152.0**
Total		Count	155	74	171	67	33	**500**
		Expected Count	155.0	74.0	171.0	67.0	33.0	**500.0**

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.620[a]	4	.805
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 10.03.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.057	.805
	Cramer's V	.057	.805
N of Valid Cases		500	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.37: Year of Study * Student Learning 3

In the Year of Study, of the five hundred students surveyed, overall three hundred and forty eight (348) students prefer Doing 69.6% which states *that 'I am flexible and open minded'* to Watching with one hundred and fifty two students (152) or 30.4% which states that *'I am careful and cautious.' .* Table 4.12 illustrates that of the one hundred and fifty five (155) students enrolled in Year 1 (Business Management and Information Technology courses) prefer Doing with 72.3% to Watching with 27.7%. Of the seventy four (74) students in Year 2 degree courses, they prefer Doing with

67.6% to Watching with 32.4%. Of the one hundred and seventy one (171) students in the Year 3 degree courses, they prefer Doing with 70.2% to Watching with 29.8%. Of the sixty seven (67) students in MBA post graduate course, they prefer Doing with 64.2% to Watching with 35.8%. Of the thirty three (33) students in MSc post graduate course, they also prefer Watching with 69.7% to Doing with 30.3%. According to Honey and Mumford's learning styles cycle, overall the students tend to be activist (having an experience) rather than reflector (reviewing an experience) on the Kolb's processing continuum. From the results in Table 4.12, students at both undergraduate and post graduate level preferred having the experience (activist) as opposed to reviewing an experience (reflector) as seen in Fig 4.23.

The two variables used in this test were Year of Study and Student Learning4

Student Learning 4 (SL4): Doing - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it.

The two variables used for this test were Year of Study and SL3 as stated above

The results of this cross tabulation gave the following:

χ^2 (4) = 4.974.p =.290; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Year of Study is not giving any observable difference for SL4.

			Year of Study					Total
			Year 1	Year 2	Year 3	MBA	MSc	
Student Learning 4	**Doing**	Count	83	38	85	28	12	**246**
		Expected Count	76.3	36.4	84.1	33.0	16.2	**246.0**
	Watching	Count	72	36	86	39	21	**254**
		Expected Count	78.7	37.6	86.9	34.0	16.8	**254.0**
Total		Count	155	74	171	67	33	**500**
		Expected Count	155.0	74.0	171.0	67.0	33.0	**500.0**

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.974[a]	4	.290
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 16.24.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.100	.290
	Cramer's V	.100	.290
N of Valid Cases		500	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Table 38.13: Year of Study * Student Learning 4

In the Year of Study, of the five hundred students surveyed, overall two hundred and forty six (246) students or 49.2% chose Doing which states *that* **‘**I like to try new and different things without too much preparation’ to Watching with two hundred and fifty four students (254) or 50.8% which states that *‘I investigate a new topic or process in depth before trying it’.* Table 4.13 illustrates that of the one hundred and fifty five (155) students enrolled in Year 1 (Business Management and Information Technology courses) chose Doing with 53.5% to Watching with 46.5%. Of the seventy four (74) students in Year 2 degree courses, they prefer Doing with 51.4% to Watching with 48.6%. Of the one hundred and seventy one (171) students in the Year 3 degree courses, they chose Doing with 49.7% to Watching with 50.3%. Of the sixty seven (67) students in MBA post graduate course, they chose Doing with 41.8% and Watching with 58.2%. Of the thirty three (33) students in MSc post graduate course, they also chose Watching with 63.6% to Doing with 36.4%.

According to Honey and Mumford's learning styles cycle, overall, there is no significant margin to indicate that students prefer to have an experience (Doing) as opposed to reviewing an experience (Watching). Students in Year 1, Year 2 and Year 3 prefer to have an experience rather than reviewing an experience. Also, from the results in Table 4.13, students at post graduate level preferred reviewing the experience (reflector) as opposed to having an experience (activist) as illustrated in Fig 4.24.

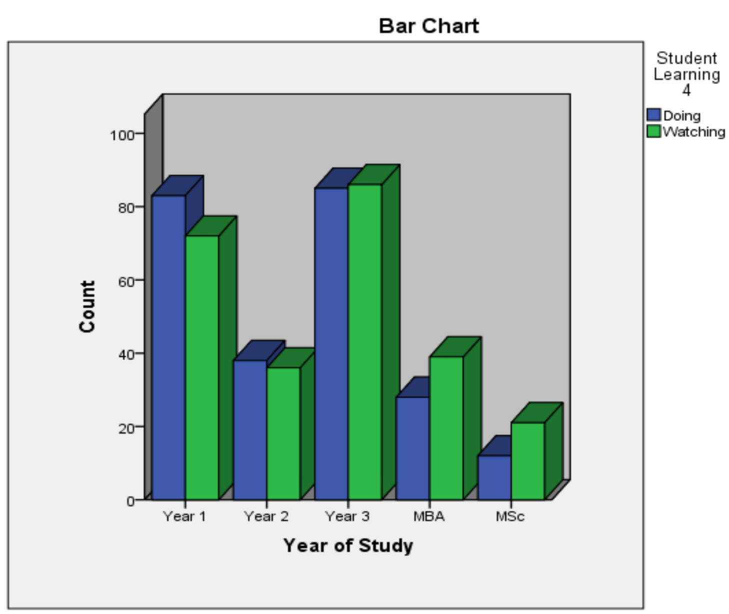


Fig 4.24: Year of Study and SL4

Student Learning 5 (SL5): Doing - I am happy to have a go at new things. **Watching** - I draw up lists of possible courses of actions when starting a new project.

The results of this cross tabulation gave the following:

χ^2 (4) = 11.167.p =.025; H_0 = rejected

There was an observable difference in responses therefore the null hypothesis, H_0, has been rejected. This indicates that the Year of Study is giving an observable difference for SL5.

			Year of Study					Total
			Year 1	Year 2	Year 3	MBA	MSc	
Student Learning 5	**Doing**	Count	106	37	111	35	18	**307**
		Expected Count	95.2	45.4	105.0	41.1	20.3	**307.0**
	Watching	Count	49	37	60	32	15	**193**
		Expected Count	59.8	28.6	66.0	25.9	12.7	**193.0**
Total		Count	155	74	171	67	33	**500**
		Expected Count	155.0	74.0	171.0	67.0	33.0	**500.0**

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.167[a]	4	.025
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 12.74.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.149	.025
	Cramer's V	.149	.025
N of Valid Cases		500	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.14: Year of Study * Student Learning 5

In the Year of Study, of the five hundred students surveyed, overall three hundred and seven (307) students or 61.4% chose Doing which states *that* '*I am happy to have a go at new things'* to Watching with one hundred and ninety three students (193) or 38.6% which states that *'I draw up lists of possible courses of actions when starting a new project'.* Table 4.14 illustrates that of the one hundred and fifty five (155) students enrolled in Year 1 (Business Management and Information Technology courses) chose Doing with 68.4% to Watching with 31.6%. Of the seventy four (74) students in Year 2 degree courses, an equal number of students chose Doing with 50% and Watching with 50%. Of the one hundred and seventy one (171) students in the Year 3 degree courses, they chose Doing with 64.9% to Watching with 35.1%. Of the sixty seven (67) students in MBA post graduate course, they chose Doing with 52.2% and Watching with 47.8%. Of the thirty three (33) students in MSc post graduate course, they also chose Watching with 54.5% to Doing with 45.5%. According to Honey and Mumford's learning styles cycle, overall the students tend to be activist (having an experience) rather than reflector (reviewing an experience) on the Kolb's processing continuum. From the results in Table 4.14, students at both undergraduate and post graduate level preferred having the experience (activist) as opposed to reviewing an experience (reflector) as illustrated in Fig 4.25.

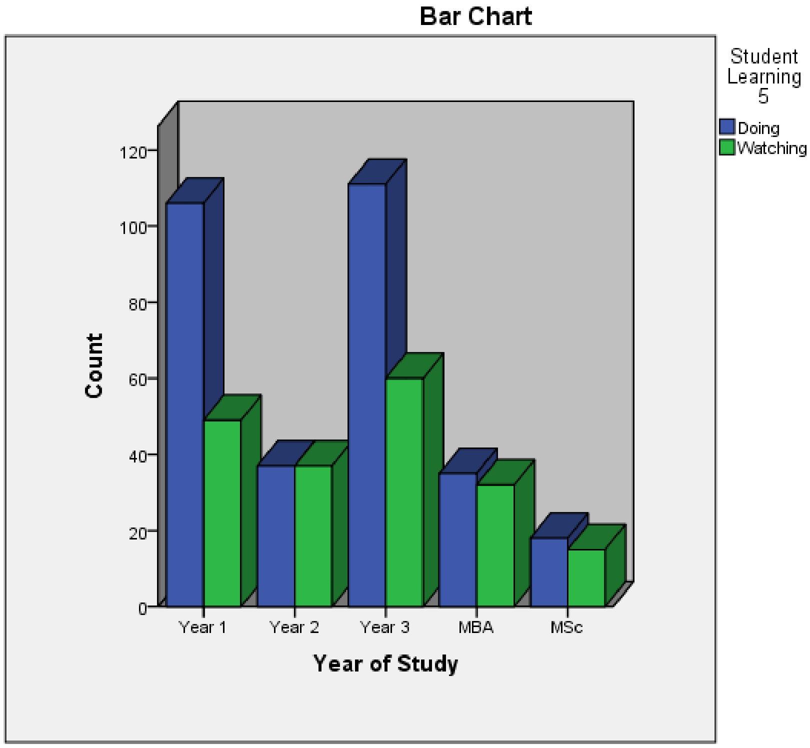


Fig 4.25: Year of Study and SL5

Student Learning 6 (SL6): Doing - I like to get involved and to participate. **Watching** - I like to read and observe.

The two variables used for this test were Year of Study and SL6 as stated above.

The results of this cross tabulation gave the following:

χ^2 (4) = 6.779.p =.148; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Year of Study is not giving any observable difference for SL6.

			Year of Study					Total
			Year 1	Year 2	Year 3	MBA	MSc	
Student Learning 6	**Doing**	Count	95	54	101	36	18	**304**
		Expected Count	94.2	45.0	104.0	40.7	20.1	**304.0**
	Watching	Count	60	20	70	31	15	**196**
		Expected Count	60.8	29.0	67.0	26.3	12.9	**196.0**
Total		Count	155	74	171	67	33	**500**
		Expected Count	155.0	74.0	171.0	67.0	33.0	**500.0**

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.779[a]	4	.148
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 12.94.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.116	.148
	Cramer's V	.116	.148
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.15: Year of Study * Student Learning 6

In the Year of Study, of the five hundred students surveyed, overall three hundred and four (304) students or 60.8% chose Doing which states *that* **'***I like to get involved and to participate'* to Watching with one hundred and ninety six students (196) or 39.2% which states that *'I like to read and observe'.* Table 4.15 illustrates that of the one hundred and fifty five (155) students enrolled in Year 1 (Business Management and Information Technology courses) 61.3% chose Doing to Watching with 38.7%. Of the seventy four (74) students in Year 2 degree courses, 72.9% chose Doing while 27.1% chose Watching. Of the one hundred and seventy one (171) students in the Year 3 degree courses, 59.1% chose Doing to Watching with 40.9%. Of the sixty seven (67) students in MBA post graduate course, 53.7% chose Doing and 46.3% chose Watching. Of the thirty three (33) students in MSc post graduate course, 54.5% chose Doing while 45.5% chose Watching. According to Honey and Mumford's learning styles cycle, overall the students tend to be activist (having an experience) rather than reflector (reviewing an experience) on the Kolb's processing continuum. From the results in Table 4.15, students at both undergraduate and post graduate level preferred having the experience (activist) as opposed to reviewing an experience (reflector) as illustrated in Fig 4.26.

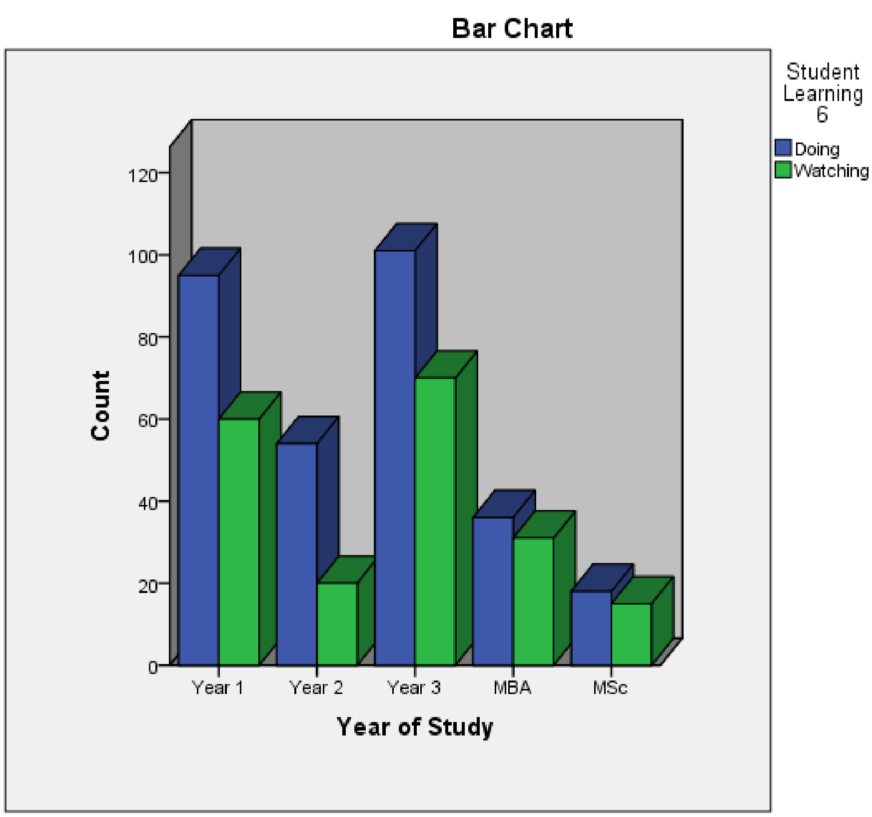


Fig 4.26: Year of Study and SL6

Student Learning 7 (SL7): Doing - I am loud and outgoing. **Watching** - I am quiet and somewhat shy.

The results of this cross tabulation gave the following:

χ^2 (4) = 5.704.p =.222; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Year of Study is not giving any observable difference for SL7.

In the Year of Study, of the five hundred students surveyed, overall two hundred and two (202) students or 40.4% chose Doing which states *that* **'***I am loud and outgoing'* while two hundred and ninety eight students (298) or 59.6% preferred Watching which states that *'I am quiet and somewhat shy'.* Table 4.16 illustrates that of the one hundred and fifty five (155) students enrolled in Year 1 (Business Management and Information Technology courses) 43.9% chose Doing whilst 56.1% chose Watching. Of the seventy four (74) students in Year 2 degree courses, 45.9% chose Doing while 54.1% chose Watching. Of the one hundred and seventy one (171) students in the Year 3 degree courses, 38% chose Doing and 62% chose Watching. Of the sixty seven (67) students in MBA post graduate course, 40.3% chose Doing and 59.7% chose Watching. Of the thirty three (33) students in MSc post graduate course, 24.2% chose Doing while 75.8% preferred Watching. According to Honey and Mumford's learning styles cycle, overall the students tend to be reflector (reviewing an experience) rather than activist (having an experience) on the Kolb's processing continuum. From the results in Table 4.16, students at both undergraduate and post graduate level preferred reviewing an experience (reflector) as opposed to having the experience (activist) as illustrated in Fig 4.27.

			Year of Study					Total
			Year 1	Year 2	Year 3	MBA	MSc	
SL7	Doing	Count	68	34	65	27	8	**202**
		Expected Count	62.6	29.9	69.1	27.1	13.3	**202.0**
	Watching	Count	87	40	106	40	25	**298**
		Expected Count	92.4	44.1	101.9	39.9	19.7	**298.0**
Total		Count	155	74	171	67	33	**500**
		Expected Count	155.0	74.0	171.0	67.0	33.0	**500.0**

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.704[a]	4	.222
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 13.33.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.107	.222
	Cramer's V	.107	.222
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.16 : Year of Study * Student Learning 7

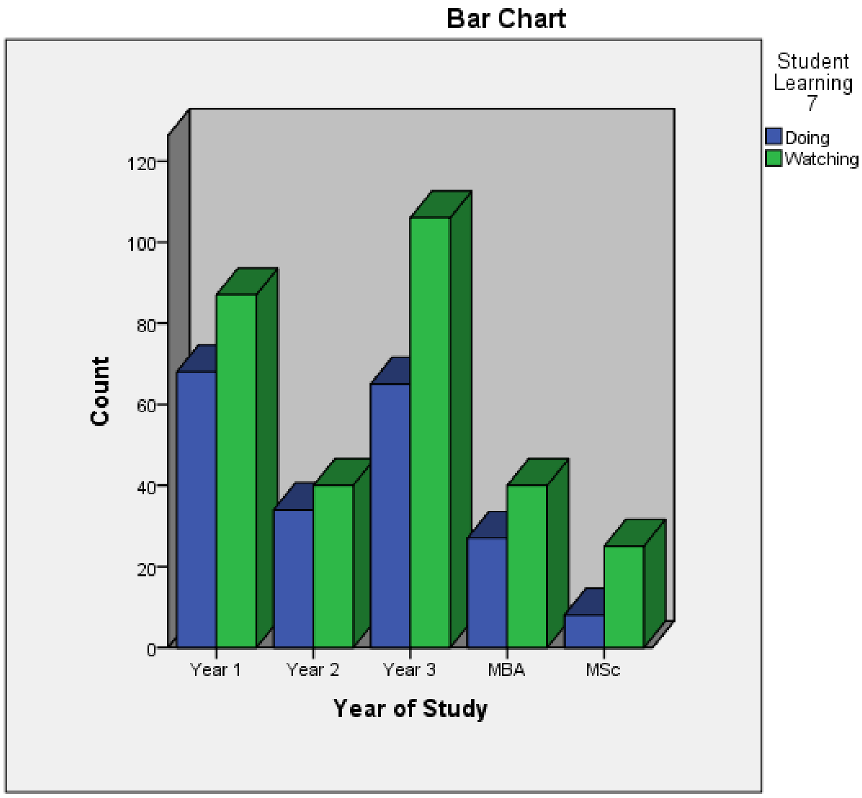


Fig 4.27: Year of Study and SL7

Student Learning 8 (SL8): Doing - I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

The two variables used for this test were Year of Study and SL6 as stated above.

The results of this cross tabulation gave the following:

χ^2 (4) = 3.227.p =..521; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Year of Study is not giving any observable difference for SL8.

			Student Learning 8		Total
			Doing	Watching	
Year of Study	Year 1	Count	**37**	**118**	**155**
		% within Year of Study	23.9%	76.1%	100.0%
	Year 2	Count	**14**	**60**	**74**
		% within Year of Study	18.9%	81.1%	100.0%
	Year 3	Count	**42**	**129**	**171**
		% within Year of Study	24.6%	75.4%	100.0%
	MBA	Count	**16**	**51**	**67**
		% within Year of Study	23.9%	76.1%	100.0%
	MSc	Count	**4**	**29**	**33**
		% within Year of Study	12.1%	87.9%	100.0%
Total		Count	**113**	**387**	**500**
		% within Year of Study	22.6%	77.4%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.227[a]	4	.521
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.46.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.080	.521
	Cramer's V	.080	.521
N of Valid Cases		500	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.17: Year of Study * Student Learning 8

In the Year of Study, of the five hundred students surveyed, overall three hundred and eighty seven (387) students prefer Watching or 77.4% which states that *'I make cautious and logical decisions'* to one hundred and thirteen students (113) Doing 22.6% which states that ***'****I make quick and bold decisions'.* Table 4.17 illustrates that of the one hundred and fifty five (155) students enrolled in Year 1 (Business Management and Information Technology courses) prefer Watching with 76.1% to Doing with 23.9%. Of the seventy four (74) students in Year 2 degree courses, they prefer Watching with 81.1% to Doing with 18.9%. Of the one hundred and seventy one (171) students in the

Year 3 degree courses, they prefer Watching with 75.4% to Doing with 24.6%. Of the sixty seven (67) students in MBA post graduate course, they prefer Watching with 76.1% to Doing with 23.9%. Of the thirty three (33) students in MSc post graduate course, they also prefer Watching with 87.9% to Doing with 12.1%. According to Honey and Mumford's learning styles cycle, overall the students tend to be reflector (reviewing an experience) rather than activist (having an experience) on the Kolb's processing continuum. From the results in Table 4.17, students at both undergraduate and post graduate level preferred reviewing an experience (reflector) as opposed to having the experience (activist).

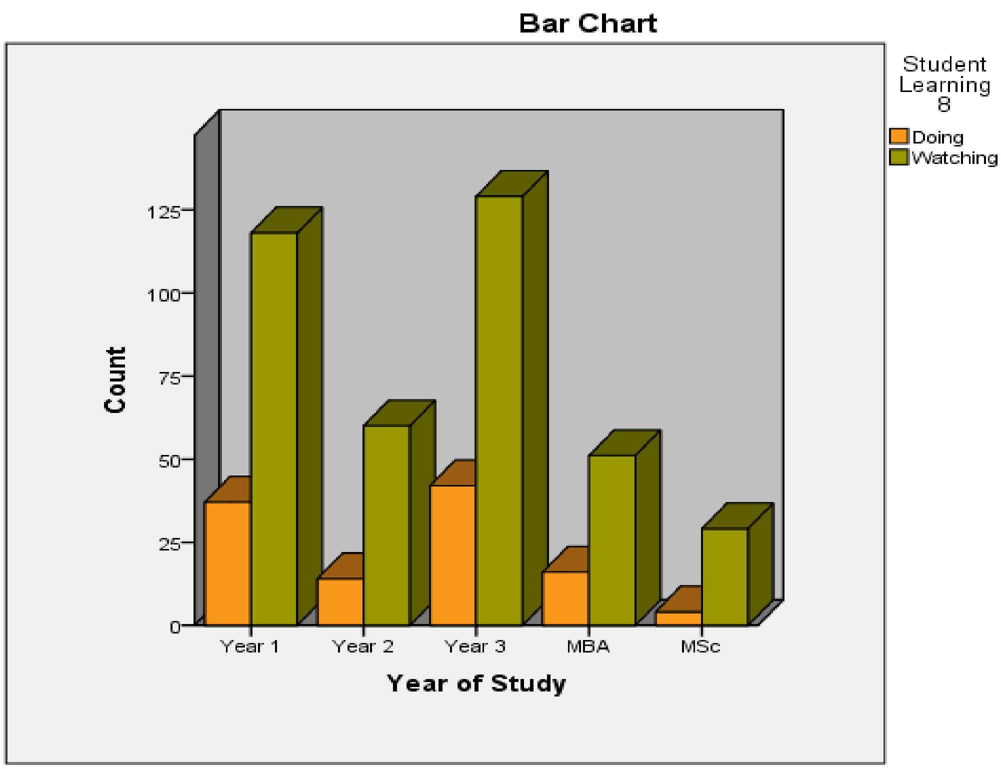


Fig 4.28: Year of Study and SL8

The two variables used in this test were Year of Study and Student Learning 9: **Student Learning 9 (SL9): Doing** - I speak fast, while thinking. **Watching** - I speak slowly, after thinking.

The results of this cross tabulation gave the following:

χ^2 (4) = 1.998, p =0.736; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Year of Study is not giving any observable difference for SL9.

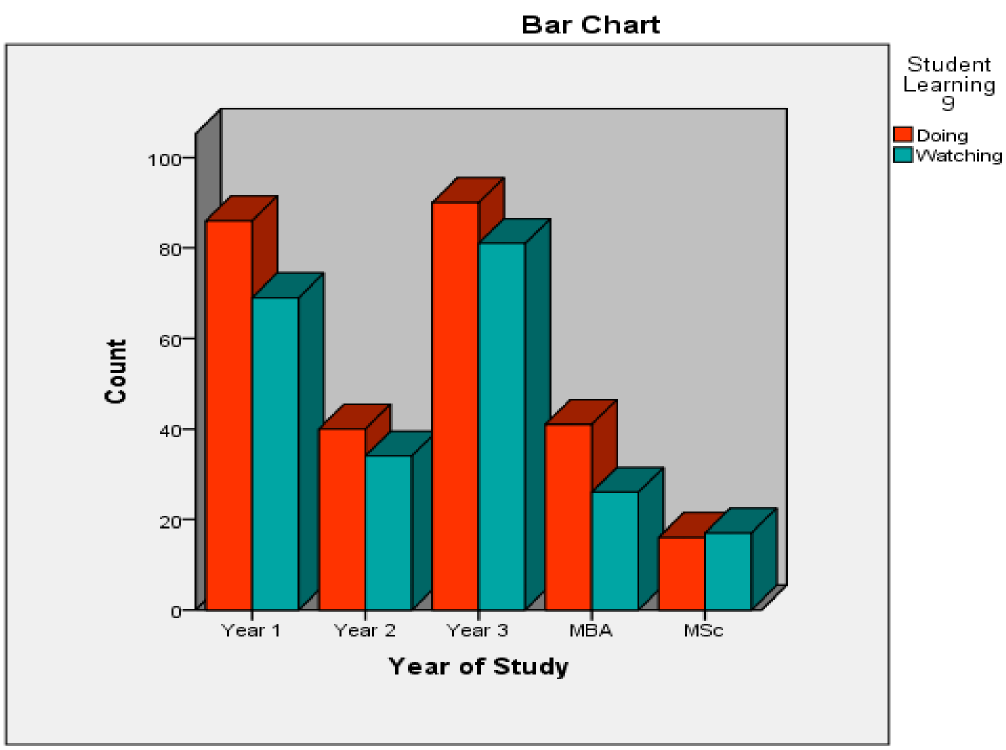


Fig 4.29: Year of Study and SL9

In the Year of Study, of the five hundred students surveyed, overall two hundred and seventy three (273) students prefer Doing 54.6% which states *that* **'***I speak fast, while thinking'* to Watching with two hundred and twenty seven students (227) or 45.5% which states that *'I speak slowly, after thinking' .* Table 4.18 illustrates that of the one hundred and fifty five (155) students enrolled in Year 1 (Business Management and Information Technology courses) prefer Doing with 55.5% to Watching with 44.5%. Of the seventy four (74) students in Year 2 degree courses, they prefer Doing with 54.1% to Watching with 45.9%. Of the one hundred and seventy one (171) students in the Year 3 degree courses, they prefer Doing with 52.6% to Watching with 47.4%. Of the sixty seven (67) students in MBA post graduate course, they prefer Doing with 61.2% to Watching with 38.8%. Of the thirty three (33) students in MSc post graduate course, they also prefer Doing with 48.5% to Watching with 51.5%. According to Honey and Mumford's learning styles cycle, overall the students tend to be activist (having an experience) rather than reflector (reviewing an experience) on the Kolb's processing continuum. From the results in Table 18, students at both undergraduate and post graduate level preferred having the experience (activist) as opposed to reviewing an experience (reflector) as seen in Fig 4.29.

			Student Learning 9		Total
			Doing	Watching	
Year of Study	Year 1	Count	**86**	**69**	**155**
		% within Year of Study	55.5%	44.5%	100.0%
	Year 2	Count	**40**	**34**	**74**
		% within Year of Study	54.1%	45.9%	100.0%
	Year 3	Count	**90**	**81**	**171**
		% within Year of Study	52.6%	47.4%	100.0%
	MBA	Count	**41**	**26**	**67**
		% within Year of Study	61.2%	38.8%	100.0%
	MSc	Count	**16**	**17**	**33**
		% within Year of Study	48.5%	51.5%	100.0%
Total		Count	**273**	**227**	**500**
		% within Year of Study	54.6%	45.4%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.998[a]	4	.736
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 14.98.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.063	.736
	Cramer's V	.063	.736
N of Valid Cases		500	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.18: Year of Study * Student Learning 9

The two variables used in this test were option of Study and Student Learning 1: **SL1: Doing** - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical.

The results of this cross tabulation gave the following:

χ^2 (2) = 14.818.p =.001. H_0 = rejected

There was observable difference in responses therefore the null hypothesis, H_0, has been rejected. This indicates that the Option of Study is giving an observable difference for SL1.

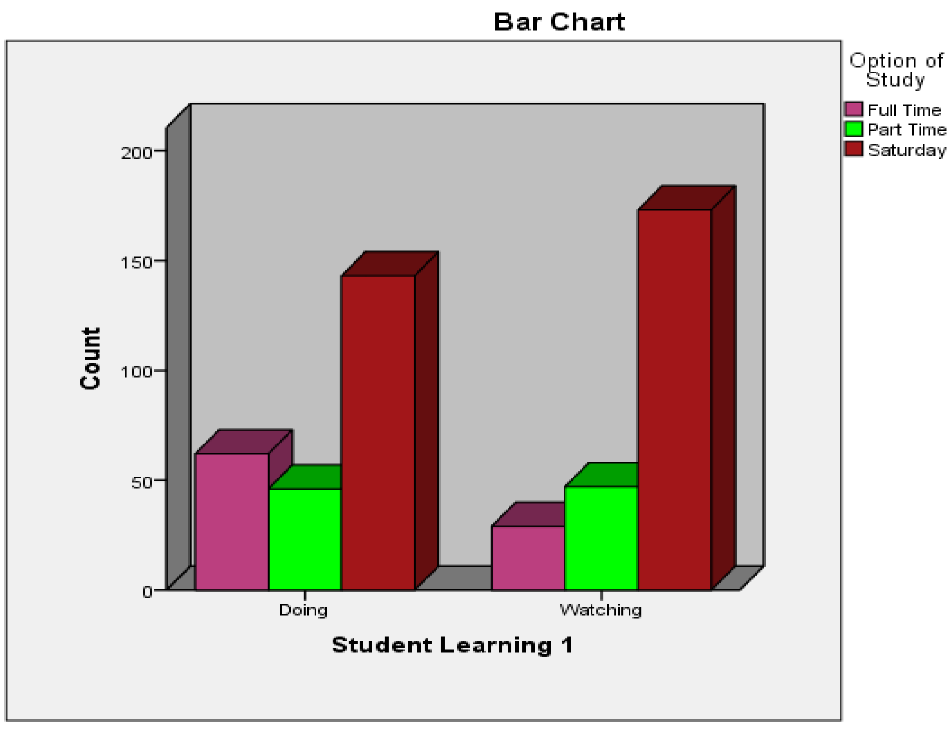


Fig 4.30: Option of Study and SL1

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 1	**Doing**	Count	**62**	**46**	**143**	**251**
		% within Option of Study	68.1%	49.5%	45.3%	50.2%
	Watching	Count	**29**	**47**	**173**	**249**
		% within Option of Study	31.9%	50.5%	54.7%	49.8%
Total		Count	**91**	**93**	**316**	**500**
		% within Option of Study	100.0%	100.0%	100.0%	100.0%

Table 4.19: Student Learning 1 * Option of Study

In the Option of Study, of the five hundred students surveyed, overall two hundred and fifty one (251) students prefer Doing 50.2% which states *that* **'***I often produce off-the-cuff ideas that at first might seem silly or half-baked'* to Watching with two hundred and forty nine students (249) or 49.8% which states that '*I am thorough and methodical'.* Table 4.19 illustrates that of the ninety one (91) students enrolled as Full Time students (Business Management and Information Technology courses inclusive of Year 1, Year 2 and Year 3 students) prefer Doing with 68.1% to Watching with 31.9%. Of the ninety three (93) students enrolled in the degree courses as Part time option (inclusive of undergraduate and postgraduate students pursuing Business Management and Information Technology courses) they prefer Watching with 50.5% to Doing with 45.9%. Of the three hundred and sixteen (316) students enrolled as Saturday option (inclusive of both undergraduate and post graduate students) they prefer Watching with 54.7% to Doing with 45.3%. According to Honey and Mumford's learning styles cycle, overall the students tend to be activist (having an experience) rather than reflector (reviewing an experience) on the Kolb's processing continuum. From the results in Table 4.19, full time students at both undergraduate preferred having the experience (activist) as opposed to reviewing an experience (reflector). Whilst part time and Saturday students both at undergraduate and post graduate level seemed to prefer reviewing an experience rather than having the experience, as seen in Fig 4.30.

The two variables used in this test were option of Study and Student Learning 2: **SL2: Doing** - I am normally the one who initiates conversations. **Watching** - I enjoy watching people

The results of this cross tabulation gave the following:

χ^2 (2) = 0.780.p =.677; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Option of Study is not giving any observable difference for SL2.

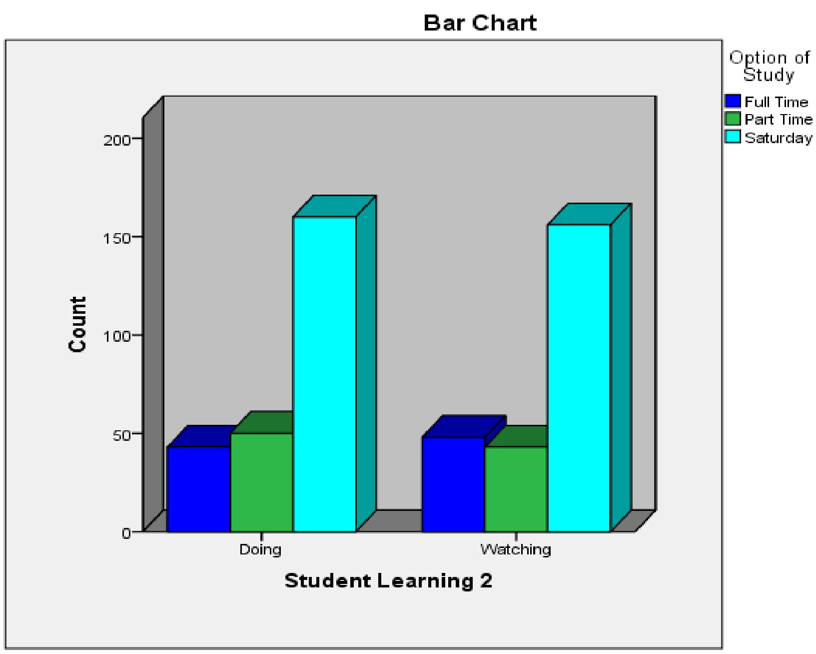


Fig 4.31: Option of Study and SL2

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 2	Doing	Count	**43**	**50**	**160**	**253**
		% within Option of Study	47.3%	53.8%	50.6%	50.6%
	Watching	Count	**48**	**43**	**156**	**247**
		% within Option of Study	52.7%	46.2%	49.4%	49.4%
Total		Count	**91**	**93**	**316**	**500**
		% within Option of Study	100.0%	100.0%	100.0%	100.0%

Table 4.20: Student Learning 2 * Option of Study

In the Option of Study, of the five hundred students surveyed, overall two hundred and fifty three (253) students prefer Doing 50.6% which states *that* **'***I am normally the one who initiates conversations'* to Watching with two hundred and forty seven students (249) or 49.4% which states that '*I enjoy watching people.'* Table 4.20 illustrates that of the ninety one (91) students enrolled as Full Time students prefer Watching with 52.7% to Doing with 47.3%. Of the ninety three (93) students enrolled in the degree courses as Part time option, they prefer with Doing 53.8% to Watching with 46.2%. Of the three hundred and sixteen (316) students enrolled as Saturday option, there is no significant margin to indicate that students prefer to have an experience (Doing) – 50.6% as opposed to reviewing an experience (Watching) – 49.4%. According to Honey and Mumford's learning styles cycle, overall the students tend to be activist (having an experience) rather than reflector (reviewing an experience) on the Kolb's processing continuum. From the results in Table 4.20, full time students at undergraduate preferred reviewing an experience (reflector) as opposed to having the experience (activist). Whilst part time students both at undergraduate and post graduate level seemed to prefer having the experience rather than reviewing an experience and the Saturday students there is no significant margin to indicate that students prefer to have an experience (Doing) as opposed to reviewing an experience (Watching) , as seen in Fig 4.31.

The two variables used in this test were option of Study and Student Learning 3: **SL3: Doing** - I am flexible and open minded. **Watching** - I am careful and cautious.

The results of this cross tabulation gave the following:

χ^2 (2) = 2.916, p =.233; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Option of Study is not giving any observable difference for SL3.

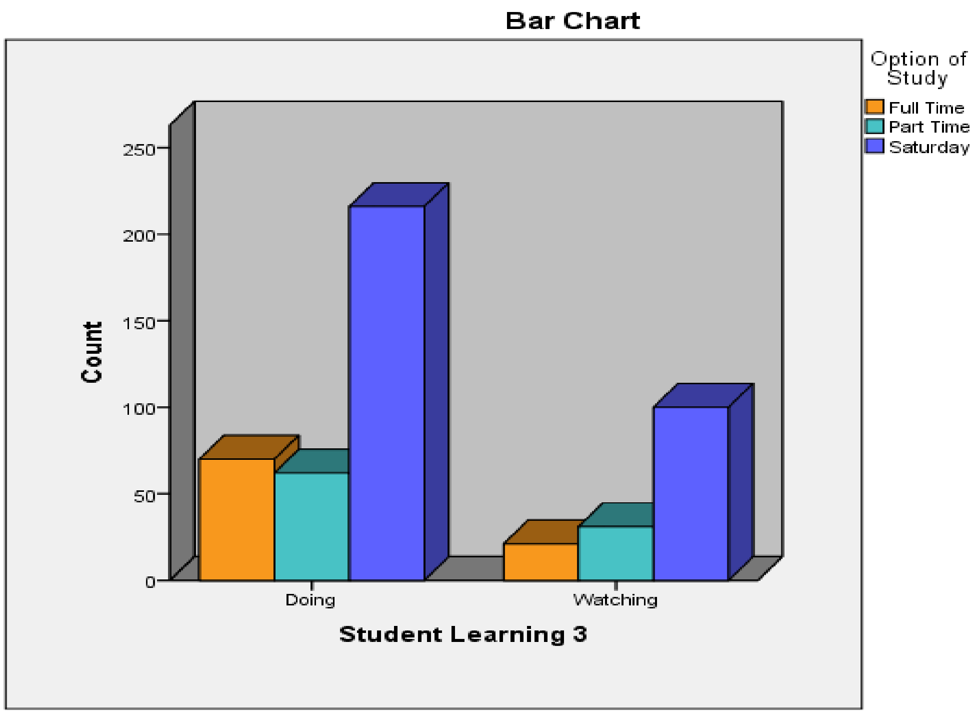


Fig 4.32: Option of Study and SL3

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 3	Doing	Count	**70**	**62**	**216**	**348**
		% within Option of Study	76.9%	66.7%	68.4%	**69.6%**
	Watching	Count	**21**	**31**	**100**	**152**
		% within Option of Study	23.1%	33.3%	31.6%	**30.4%**
Total		Count	**91**	**93**	**316**	**500**
		% within Option of Study	100.0%	100.0%	100.0%	**100.0%**

Table 4.21: Student Learning 3 * Option of Study

In the Option of Study, of the five hundred students surveyed, overall three hundred and forty eight (348) students prefer Doing 69.6% which states *that* **'***I am flexible and open minded'* to Watching with one hundred and fifty two students (152) or 30.4% which states that '*I am careful and cautious.'* Table 4.21 illustrates that of the ninety one (91) students enrolled as Full Time students prefer Doing with 76.9% to Watching with 23.1%. Of the ninety three (93) students enrolled in the degree courses as Part time option, they prefer with Doing 66.7% to Watching with 33.3%. Of the three hundred and sixteen (316) students enrolled as Saturday option, they prefer Doing with 68.4% to Watching with 31.6%. According to Honey and Mumford's learning styles cycle, overall the students tend to be activist (having an experience) rather than reflector (reviewing an experience) on the Kolb's processing continuum. From the results in Fig 4.32, students at both the undergraduate and postgraduate level prefer having the experience rather (activist) than reviewing an experience (reflector).

The two variables used in this test were option of Study and Student Learning 4: **SL4: Doing** - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it.

The results of this cross tabulation gave the following:

χ^2 (2) = 0.270.p =.874; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Option of Study is not giving any observable difference for SL4.

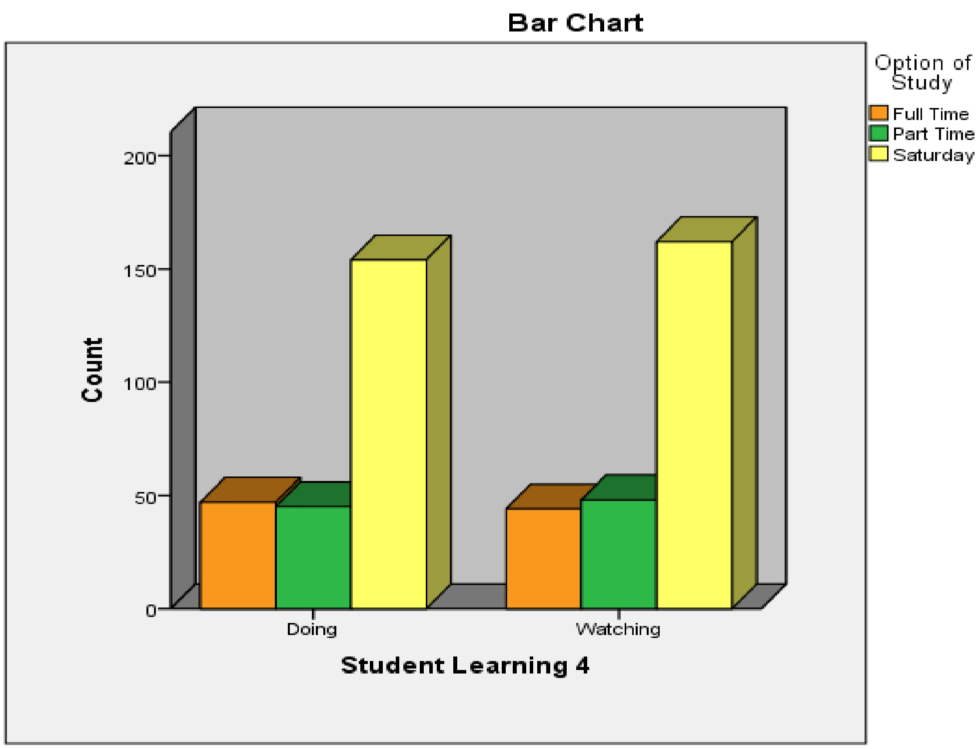


Fig 4.33: Option of Study and SL4

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 4	Doing	Count	**47**	**45**	**154**	**246**
	Watching	Count	**44**	**48**	**162**	**254**
Total		Count	**91**	**93**	**316**	**500**

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.270[a]	2	.874
N of Valid Cases	500		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 44.77.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.023	.874
	Cramer's V	.023	.874
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.22: Student Learning 4 * Option of Study

In the Option of Study, of the five hundred students surveyed, overall two hundred and fifty four (254) students prefer Watching 50.8% which states that 'I investigate a new topic or process in depth before trying it*'* to Doing with two hundred and forty six students (246) or 49.2% which states *that 'I like to try new and different things without too much preparation.'* Table 4.22 illustrates that of the ninety one (91) students enrolled as Full Time students prefer Doing with 51.6% to Watching with 48.4%. Of the ninety three (93) students enrolled in the degree courses as Part time option, they prefer with Watching 51.6% to Doing with 48.4%. Of the three hundred and sixteen (316) students enrolled as Saturday option, they prefer Watching with

51.3% to Doing with 48.7%. According to Honey and Mumford's learning styles cycle, overall there is no significant margin to indicate that students prefer to have an experience (Doing) as opposed to reviewing an experience (Watching), as illustrated in Fig 4.33.

The two variables used in this test were option of Study and Student Learning 5: **SL5: Doing** - I am happy to have a go at new things. **Watching** - I draw up lists up possible courses of actions when starting a new project.

The results of this cross tabulation gave the following:

χ^2 (2) = 4.949.p =.084; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Option of Study is not giving any observable difference for SL5.

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 5	Doing	Count	**65**	**57**	**185**	**307**
		% within Option of Study	71.4%	61.3%	58.5%	61.4%
	Watching	Count	**26**	**36**	**131**	**193**
		% within Option of Study	28.6%	38.7%	41.5%	38.6%
Total		Count	**91**	**93**	**316**	**500**
		% within Option of Study	100.0%	100.0%	100.0%	100.0%

Table 4.23: Student Learning 5* Option of Study

In the Option of Study, of the five hundred students surveyed, overall three hundred and seven (307) students prefer Doing 61.4% which states *that* **'***I am happy to have* *a go at new things'* to Watching with one hundred and ninety three students (193) or 38.6% which states that '*I draw up lists up possible courses of actions when starting a new project.'* Table 4.23 illustrates that of the ninety one (91) students enrolled as Full Time students prefer Doing with 71.4% to Watching with 28.6%. Of the ninety three (93) students enrolled in the degree courses as Part time option, they prefer with Doing 61.3% to Watching with 38.7%. Of the three hundred and sixteen (316) students enrolled as Saturday option, they prefer Doing with 58.5% to Watching with 41.5%. According to Honey and Mumford's learning styles cycle, overall the students tend to be activist (having an experience) rather than reflector (reviewing an experience) on the Kolb's processing continuum. From the results displayed in Fig 4.34, students at both the undergraduate and postgraduate level prefer having the experience rather (activist) than reviewing an experience (reflector).

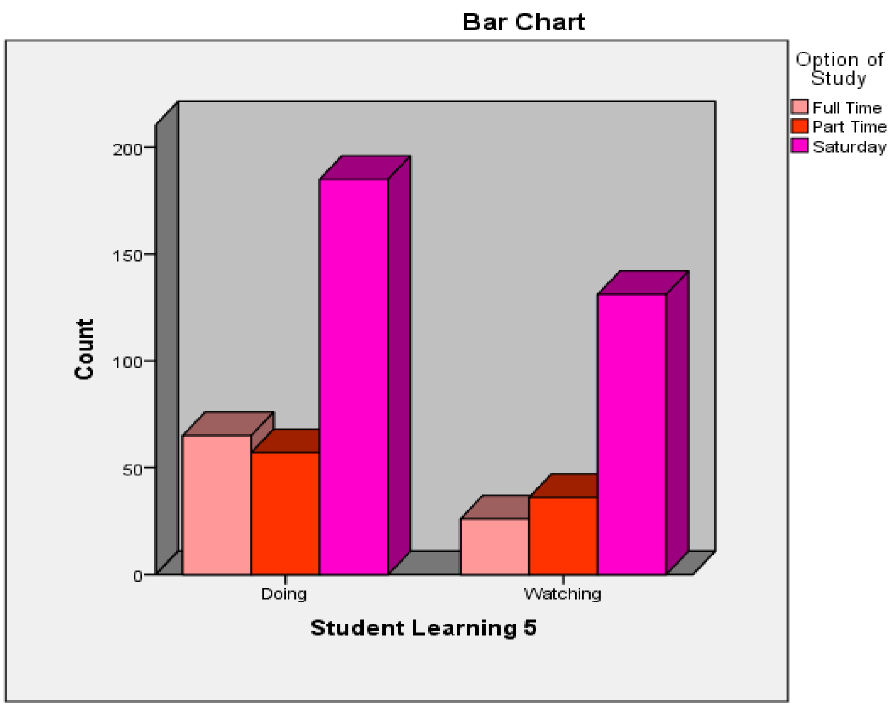


Fig 4.34: Option of Study and SL5

The two variables used in this test were option of Study and Student Learning 6: **SL6: Doing** - I like to get involved and to participate. **Watching** - I like to read and observe.

The results of this cross tabulation gave the following:

χ^2 (2) = 2.921.p =.0.232; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Option of Study is not giving any observable difference for SL6.

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 6	Doing	Count	**50**	**53**	**201**	**304**
		% within Option of Study	54.9%	57.0%	63.6%	60.8%
	Watching	Count	**41**	**40**	**115**	**196**
		% within Option of Study	45.1%	43.0%	36.4%	39.2%
Total		Count	**91**	**93**	**316**	**500**
		% within Option of Study	100.0%	100.0%	100.0%	100.0%

Table 4.24: Student Learning 6 * Option of Study

In the Option of Study, of the five hundred students surveyed, overall three hundred and four (304) students prefer Doing 60.8% which states *that* **'***I like to get involved and to participate'* to Watching with one hundred and ninety six students (196) or 38.6% which states that '*I like to read and observe.'* Table 4.24 illustrates that of the ninety one (91) students enrolled as Full Time students prefer Doing with 54.9% to Watching with 45.1%. Of the ninety three (93) students enrolled in the degree courses as Part time option, they prefer with Doing 57% to Watching with 43%. Of the three hundred and sixteen (316) students enrolled as Saturday option, they prefer Doing with 63.6% to Watching with 39.2%. According to Honey and Mumford's learning styles cycle, overall the students tend to be activist (having an experience) rather than reflector (reviewing an experience) on the Kolb's processing continuum. From the results seen in Fig 4.35, students at both the undergraduate and postgraduate level prefer having the experience rather (activist) than reviewing an experience (reflector).

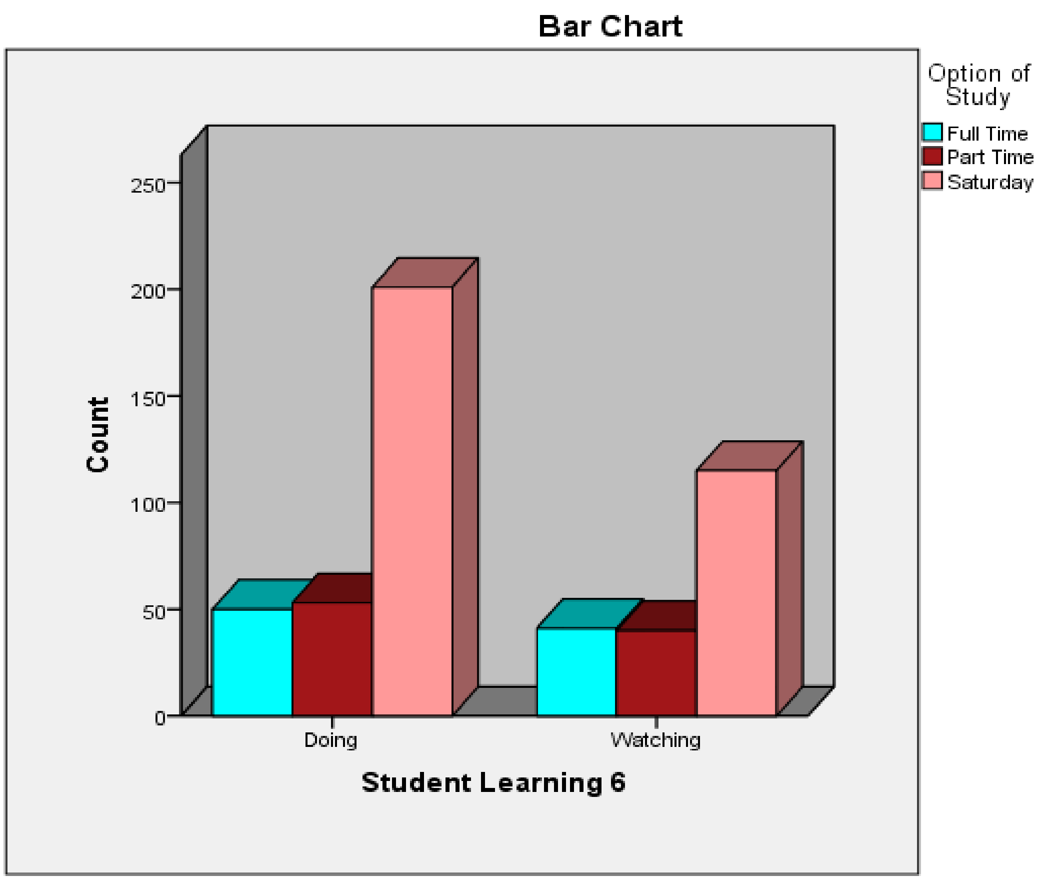


Fig 4.35: Option of Study and SL6

The two variables used in this test were option of Study and Student Learning 7:

SL7: Doing - I am loud and outgoing. **Watching** - I am quiet and somewhat shy.

The results of this cross tabulation gave the following:

χ^2 (2) = 0.711.p =.711; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Option of Study is not giving any observable difference for SL7.

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 7	Doing	Count	**38**	**34**	**130**	**202**
		% within Option of Study	41.8%	36.6%	41.1%	40.4%
	Watching	Count	**53**	**59**	**186**	**298**
		% within Option of Study	58.2%	63.4%	58.9%	59.6%
Total		Count	**91**	**93**	**316**	**500**
		% within Option of Study	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.711[a]	2	.701
Likelihood Ratio	.717	2	.699
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 36.76.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.038	.701
	Cramer's V	.038	.701
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.25: Student Learning 7* Option of Study

In the Option of Study, of the five hundred students surveyed, overall two hundred and ninety eight students (298) students prefer Watching 59.6% which states *that 'I am quiet and somewhat shy'* to Doing with two hundred and two (202) or 40.4% which states *that 'I am loud and outgoing.'* Table 4.25 illustrates that of the ninety one (91) students enrolled as Full Time students prefer Watching with 58.2% to Doing with 41.8%. Of the ninety three (93) students enrolled in the degree courses as Part time option, they prefer with Watching 63.4% to Doing with 36.6%. Of the three hundred and sixteen (316) students enrolled as Saturday option, they prefer Watching with 58.9% to Doing with 41.1%. According to Honey and Mumford's learning styles cycle, overall the students tend to be reflector (reviewing an experience) rather than activist (having an experience) on the Kolb's processing continuum. From the results displayed in Fig 4.36, students at both the undergraduate and postgraduate level seemed to prefer reviewing an experience (reflector) rather than having the experience rather (activist).

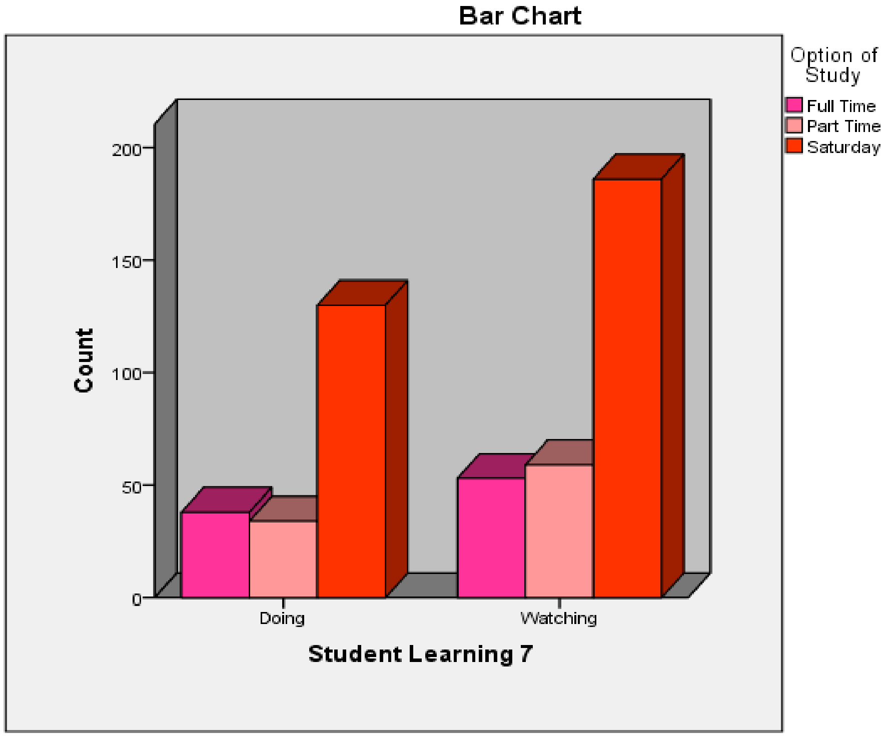


Fig 4.36: Option of Study and SL7

The two variables used in this test were option of Study and Student Learning 8: **SL8: Doing** - I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

The results of this cross tabulation gave the following:

χ^2 (2) = 0.196.p =.0907; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Option of Study is not giving any observable difference for SL8.

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 8	Doing	Count	**22**	**20**	**71**	**113**
		Expected Count	20.6	21.0	71.4	113.0
		% within Option of Study	24.2%	21.5%	22.5%	22.6%
	Watching	Count	**69**	**73**	**245**	**387**
		Expected Count	70.4	72.0	244.6	387.0
		% within Option of Study	75.8%	78.5%	77.5%	77.4%
Total		Count	**91**	**93**	**316**	**500**
		Expected Count	91.0	93.0	316.0	500.0
		% within Option of Study	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.196[a]	2	.907
Likelihood Ratio	.195	2	.907
Linear-by-Linear Association	.064	1	.800
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 20.57.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.020	.907
	Cramer's V	.020	.907
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.26: Student Learning 8* Option of Study

In the Option of Study, of the five hundred students surveyed, overall three hundred and eighty seven (387) students prefer Watching 77.4% which states that **'***I make cautious and logical decisions*' to Doing with one hundred and thirteen students (113) or 22.6% which states *that 'I make quick and bold decisions'.* Table 4.26

illustrates that of the ninety one (91) students enrolled as Full Time students prefer Watching with 75.8% to Doing with 24.2%. Of the ninety three (93) students enrolled in the degree courses as Part time option, they prefer with Watching 78.5% to Doing with 21.5%. Of the three hundred and sixteen (316) students enrolled as Saturday option, they prefer Watching with 77.5% to Doing with 22.5%. According to Honey and Mumford's learning styles cycle, overall the students tend to be reflector (reviewing an experience) rather than activist (having an experience) on the Kolb's processing continuum. From the results displayed in Fig 4.37, students at both the undergraduate and postgraduate level prefer reviewing an experience (reflector) rather than having the experience (activist).

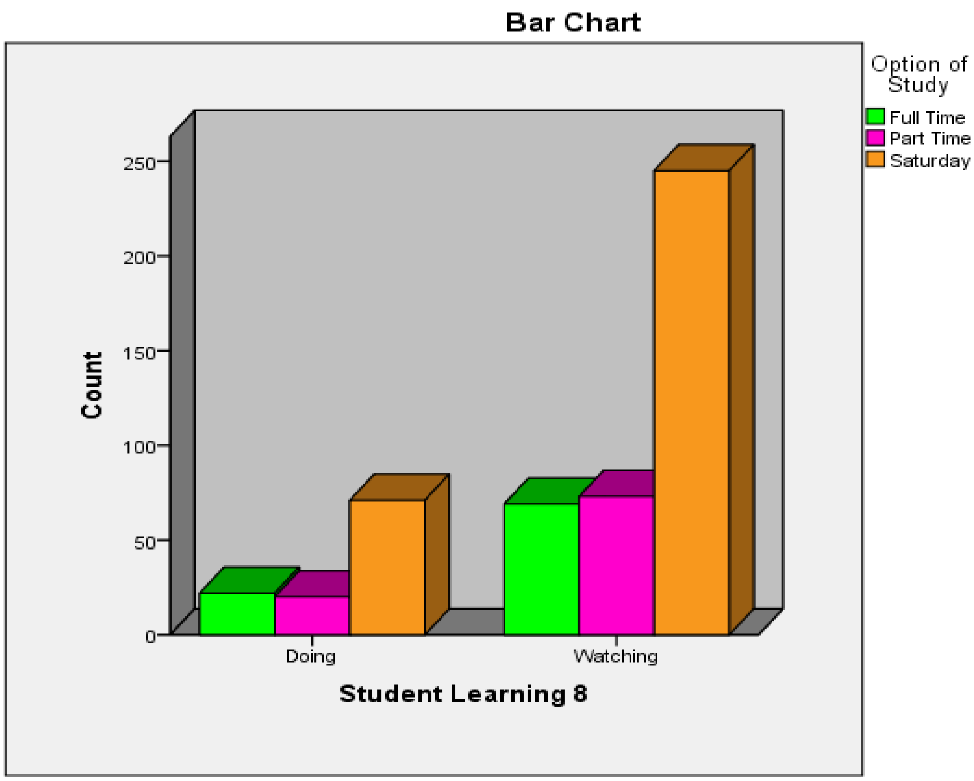


Fig 4.37: Option of Study and SL8

The two variables used in this test were option of Study and Student Learning 9: **SL9: Doing** - I speak fast, while thinking. **Watching** - I speak slowly, after thinking.

The results of this cross tabulation gave the following:

χ^2 (2) = 9.210, p =.008; H_0 = rejected

χ^2

There was an observable difference in responses therefore the null hypothesis, H_0, has been rejected. This indicates that the Option of Study is giving an observable difference for SL9.

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 9	Doing	Count	**57**	**60**	**156**	**273**
		% within Option of Study	62.6%	64.5%	49.4%	54.6%
	Watching	Count	**34**	**33**	**160**	**227**
		% within Option of Study	37.4%	35.5%	50.6%	45.4%
Total		Count	**91**	**93**	**316**	**500**
		% within Option of Study	100.0%	100.0%	100.0%	100.0%

Table 4.27: Student Learning 9* Option of Study

In the Option of Study, of the five hundred students surveyed, overall two hundred and seventy three (273) students prefer Doing with 54.6% which states *that* **‘***I speak fast, while thinking’* to Watching with two hundred and twenty seven students (227) or 45.4% which states that ‘*I speak slowly, after thinking.’* Table 4.27 illustrates that of the ninety one (91) students enrolled as Full Time students prefer Doing with 62.6% to Watching with 37.4%. Of the ninety three (93) students enrolled in the degree courses as Part time option, they prefer with Doing 4.5% to Watching with

35.5%. Of the three hundred and sixteen (316) students enrolled as Saturday option, they prefer Watching with 50.6% to Doing with 49.4%. According to Honey and Mumford's learning styles cycle, overall the students tend to be activist (having an experience) rather than reflector (reviewing an experience) on the Kolb's processing continuum. From the results in Fig 4.38, students at both the full time and part time options prefer having the experience rather (activist) than reviewing an experience (reflector), whilst there is no significant margin to indicate that students prefer to have an experience (Doing) as opposed to reviewing an experience (Watching) for the students attending Saturday classes.

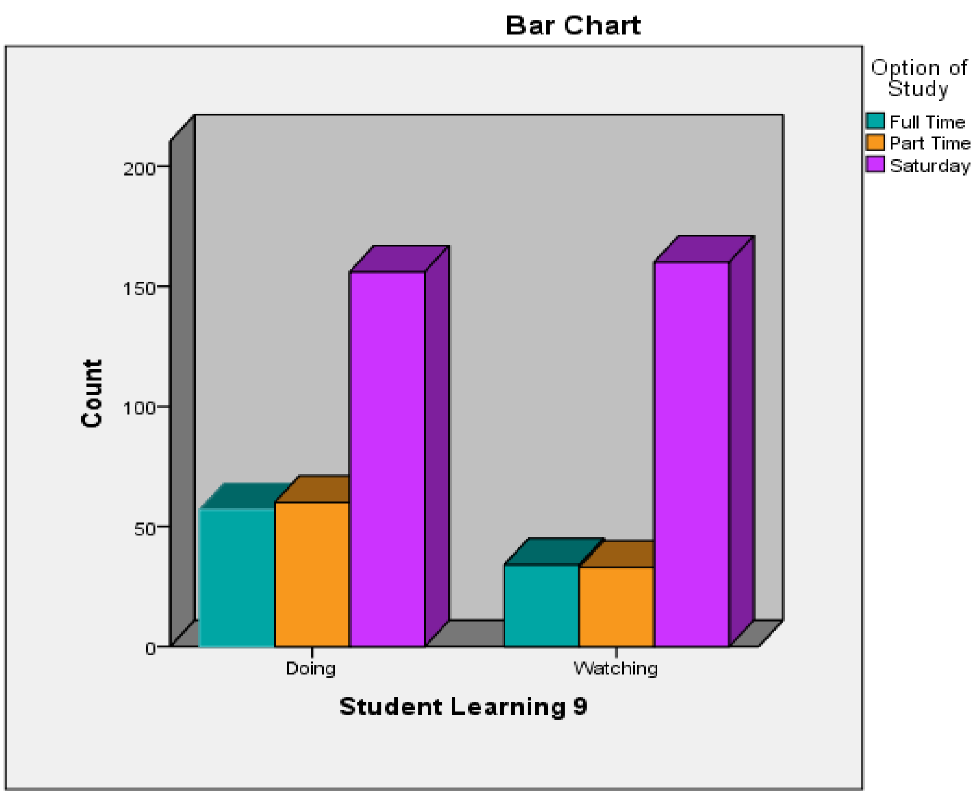


Fig 4.38: Option of Study and SL9

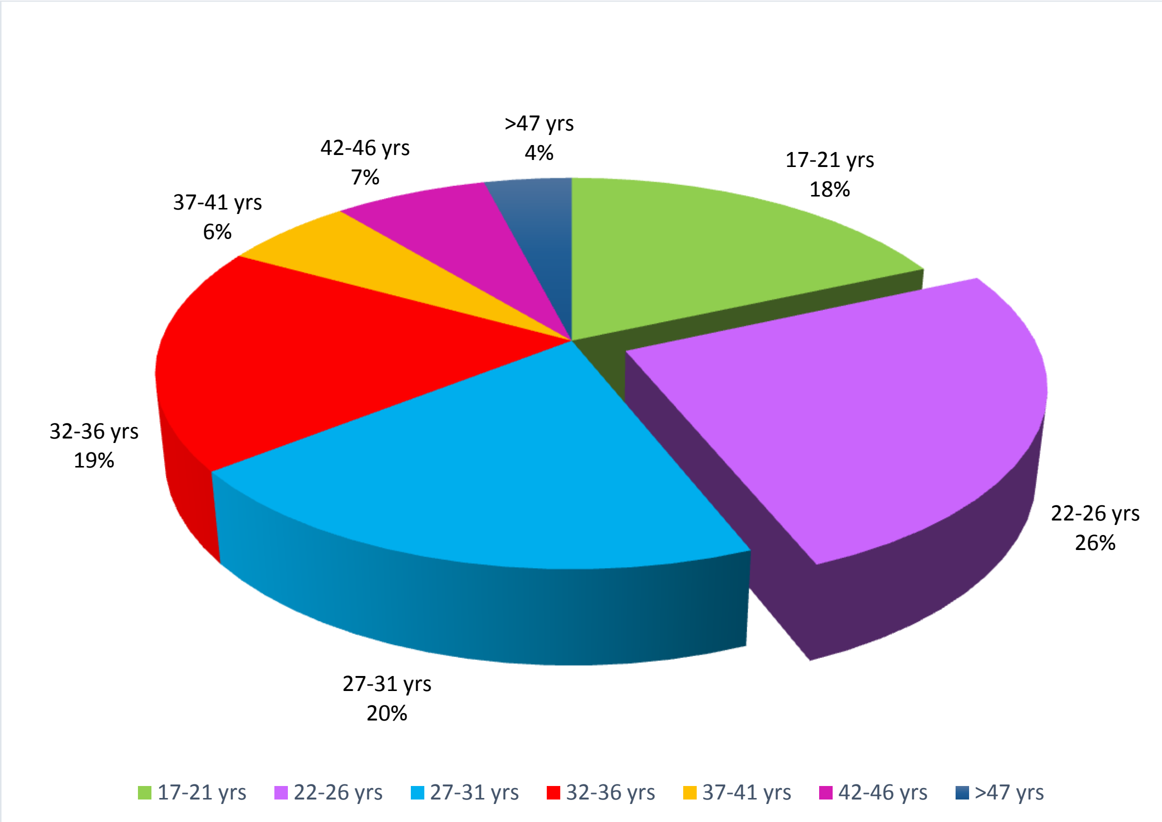


Fig 4.39: Age Group

The pie chart in Fig 4.39 displays the distribution of students according to the various age groups.

The two variables used in this test were Age Group and Student Learning 1: **SL1: Doing** - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical

The results of this cross tabulation gave the following:

χ^2 (6) = 15.225, p =0.019; H_0 = rejected

There was an observable difference in responses therefore the null hypothesis, H_0, has been rejected. This indicates that the Age Group is giving an observable difference for SL8.

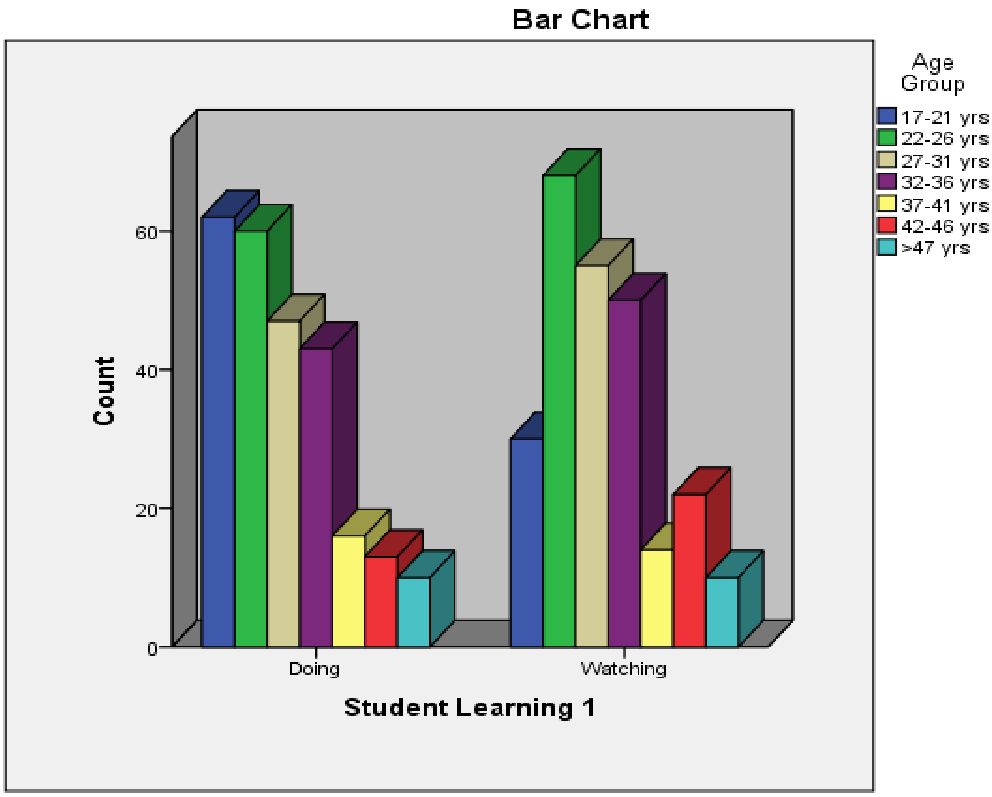


Fig 4.40: Age Group and SL1

In the Age Group, of the five hundred students surveyed, as illustrated in Fig 49, overall two hundred and fifty one (251) students prefer Doing accounting for 50.2% which states *that 'I often produce off-the-cuff ideas that at first might seem silly or half-baked'* to Watching with two hundred and forty nine students (249) or 49.8% which states that '*I am thorough and methodical'.* Of the ninety two (92) students in the seventeen to twenty one age group prefer Doing with 67.4% to Watching with 32.6%. Of the one hundred and twenty eight (128) students in the age group twenty two and twenty six years, they prefer with Watching 53.1% to Doing with 46.9%. Of the one hundred and two (102) students within the twenty seven to thirty one age groups, they prefer Watching with 53.9% to Doing with 46.2%. Of the age group of thirty two to thirty six, of the ninety three (93) students, they seemed to prefer Watching with 53.8% to Doing with 46.2%. Of the thirty (30) students in the age group thirty seven to forty one they prefer Doing with 53.3% to Watching with 46.7%. The thirty five (35) students in the forty two to forty six years category, 62.9% preferred Watching to Doing with 37.1% and the twenty (20) students who fall within the greater than forty seventy years, there was a 50% who chose Doing and the remaining 50% chose Watching. According to Honey and Mumford's learning styles cycle, overall the students tend to be activist (having an experience) rather than reflector (reviewing an experience) on the Kolb's processing continuum, as illustrated in Fig 4.40.

The two variables used in this test were Age Group and Student Learning 2: **SL2: Doing** - I am normally the one who initiates conversations. **Watching** - I enjoy watching people

The results of this cross tabulation gave the following:

χ^2 6) = 8.021, p =0.237; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Age Group is not giving any observable difference for SL2.

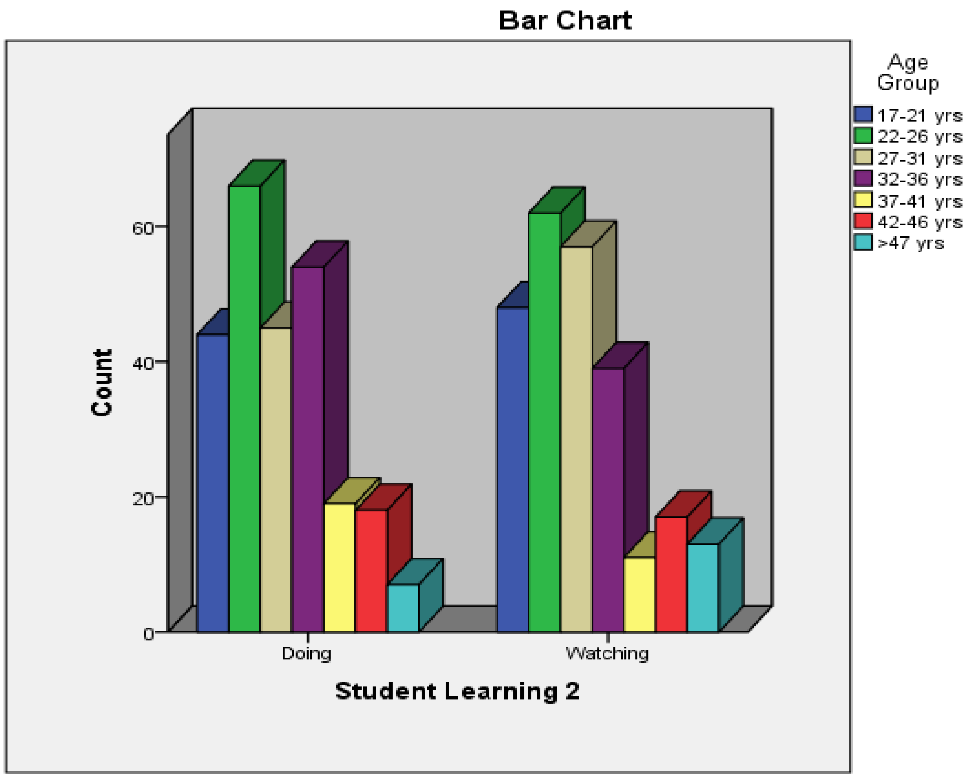


Fig 4.41: Age Group and SL2

In the Age Group, of the five hundred students surveyed, as illustrated in Fig 50, overall two hundred and fifty three (253) students prefer Doing accounting for 50.6% which states *that* **'***I am normally the one who initiates conversations'* to Watching with two hundred and forty seven students (247) or 49.4% which states that *'I enjoy watching people'.* Of the ninety two (92) students in the seventeen to twenty one age group prefer Watching with 52.2% to Doing with 47.8%. Of the one hundred and twenty eight (128) students in the age group twenty two and twenty six years, they prefer with Watching 53.1% to Doing with 46.9%. Of the one hundred and two (102) students within the twenty seven to thirty one age group, they prefer with Watching 55.9% to Doing with 44.1%. In the age group of thirty two to thirty six, of the ninety three (93) students surveyed 58.1% seemed to prefer Doing to Watching with 41.9%. The thirty (30) students in the age group thirty seven to forty one prefer 63.3% Doing with 36.7% chose Watching. The thirty five (35) students in the forty two to forty six years category, 51.4% preferred Doing with 48.6% preferred Watching and the twenty (20) students who fall within the greater than forty seventy years category, they preferred Watching with 65% to Doing with 35% chose. According to Honey and Mumford's learning styles cycle, overall the students tend to be activist (having an experience) rather than reflector (reviewing an experience) on the Kolb's processing continuum, as seen in Fig 4.41.

The two variables used in this test were Age Group and Student Learning 3: **SL3: Doing** - I am flexible and open minded. **Watching** - I am careful and cautious.

The results of this cross tabulation gave the following:

χ^2 (6) = 8.775, p =0.185; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Age Group is not giving any observable difference for SL3.

In the Age Group, of the five hundred students surveyed, as illustrated in Fig 51, overall three hundred and forty eight (348) students prefer Doing accounting for 69.6% which states *that* '*I am flexible and open minded*' to Watching with one hundred and fifty two students (152) or 30.4% which states that *'I am careful and cautious.'* Of the ninety two (92) students in the seventeen to twenty one age group prefer Doing with 71.1% to Watching with 28.3%. Of the one hundred and twenty eight (128) students in the age group twenty two and twenty six years, they prefer Doing with 66.4% to Watching with 33.6%. Of the one hundred and two (102) students within the twenty seven to thirty one age group 71.6% prefer Doing to 28.4% who chose Watching. In the age group of thirty two to thirty six, of ninety three (93) students 72%seemed to prefer Doing and 28% preferred Watching. With the thirty (30) students in the age group thirty seven to forty one 53.3% preferred Doing and 46.7% preferred Watching. The thirty five (35) students in the forty two to forty six years category, 82.9% preferred Doing with 17.1% chose Watching. The twenty (20) students who fall within the greater than forty seventy year category, they also 60% preferred Doing and 40% chose Watching. According to Honey and Mumford's learning styles cycle, overall the students tend to be activist (having an experience) rather than reflector (reviewing an experience) on the Kolb's processing continuum, as illustrated in Fig 4.42.

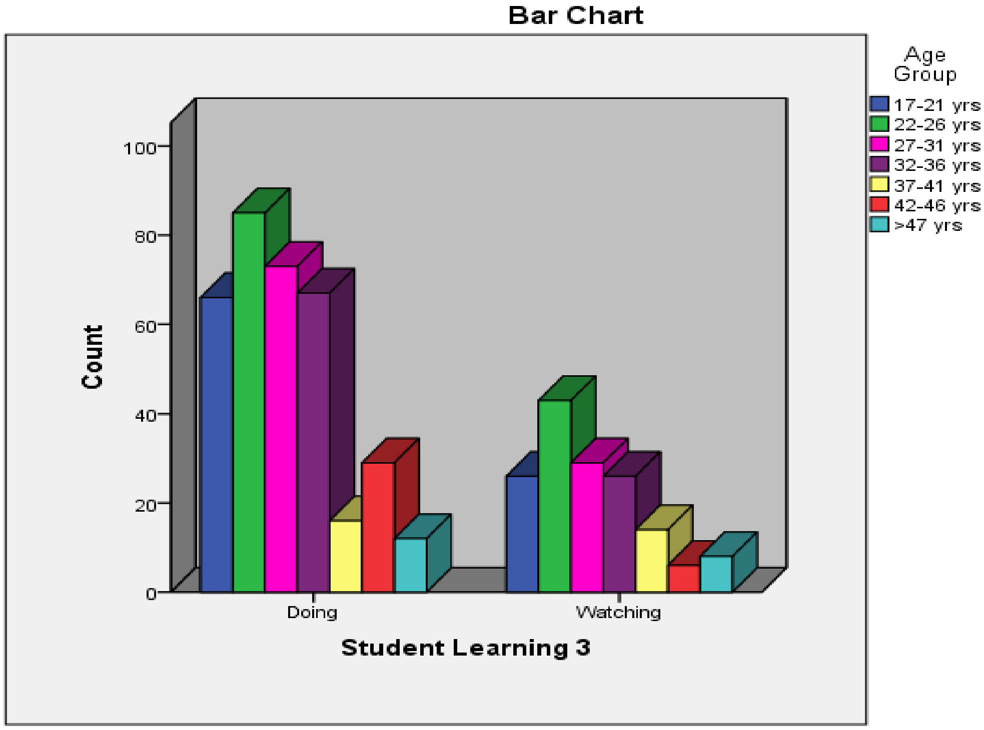


Fig 4.42: Age Group and SL3

The two variables used in this test were Age Group and Student Learning 4: **SL4: Doing** - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it.

The results of this cross tabulation gave the following:

χ^2 (6) = 10.811, p =0.094; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Age Group is not giving any observable difference for SL4.

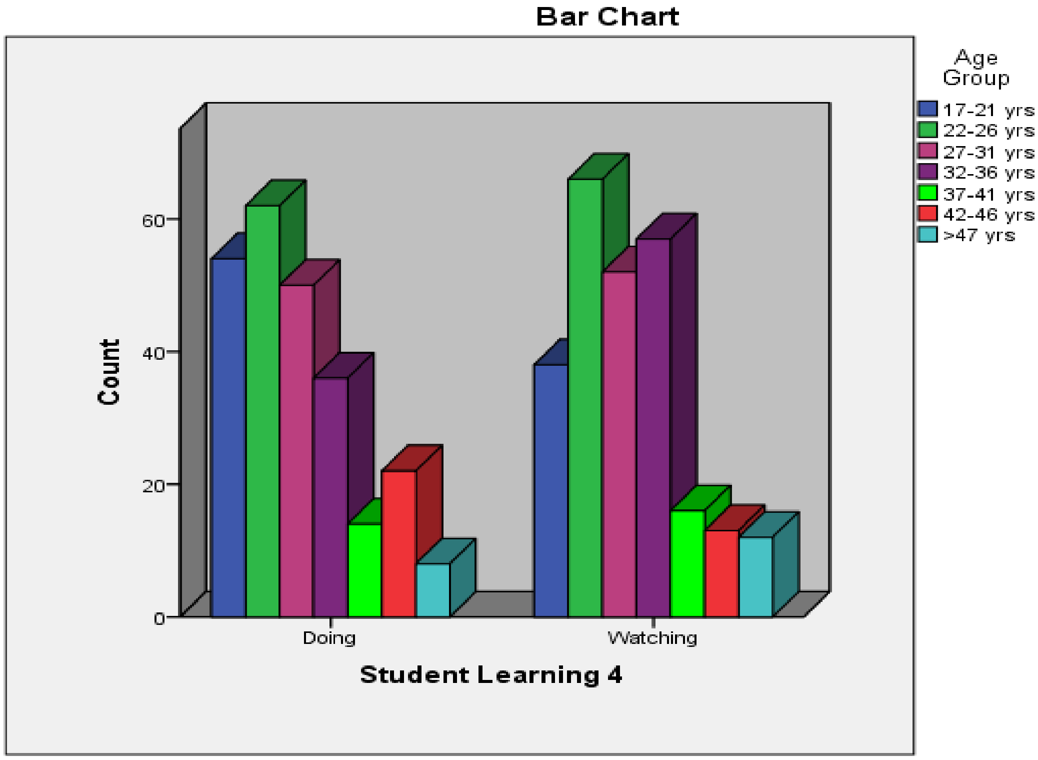


Fig 4.43: Age Group and SL4

In the Age Group, of the five hundred students surveyed, as illustrated in Fig 52, overall two hundred and fifty four (254) students prefer Watching accounting for 50.8% which states *that* **'**I investigate a new topic or process in depth before trying it' to Doing with two hundred and forty six students (246) or 49.2% which states that '**I** like to try new and different things without too much preparation'. Of the ninety two (92) students in the seventeen to twenty one age group prefer Doing with 58.7% to Watching with 41.3%. Of the one hundred and twenty eight (128) students in the age group twenty two and twenty six years, they prefer Watching with 51.6% to Doing with 48.4%. Of the one hundred and two (102) students within the twenty seven to thirty one age group 51% prefer Watching to 49% who chose Doing. In the age group of thirty two to thirty six, of the ninety three (93) students 61.3% seemed to prefer Watching and 38.7% chose Doing. The thirty (30) students in the age group thirty seven to forty one 53.3% chose Watching and 46.7% chose Doing . The thirty five (35) students in the forty two to forty six years category, 62.9% preferred Doing and 37.1% Watching and those twenty (20) students who fall within the greater than forty seventy years category, 60% preferred Watching 40% and chose Doing. According to Honey and Mumford's learning styles cycle, overall the students tend to be reflectors (reviewing an experience) rather than activists (having an experience) on the Kolb's processing continuum.

The two variables used in this test were Age Group and Student Learning 5: **SL5: Doing** - I am happy to have a go at new things. **Watching** - I draw up lists up possible courses of actions when starting a new project.

The results of this cross tabulation gave the following:

χ^2 (6) = 8.446, p =0.207; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Age Group is not giving any observable difference for SL5.

In the Age Group, of the five hundred students surveyed, as illustrated in Fig 4.44, overall three hundred and seven (307) students prefer Doing accounting for 61.4% which states *that 'I am happy to have a go at new things'* to Watching with one hundred and ninety three students (193) or 38.6% which states that *'I draw up lists up possible courses of actions when starting a new project.'* Of the ninety two (92) students in the seventeen to twenty one age group prefer Doing with 63.3% to Watching with 36.7%. Of the one hundred and twenty eight (128) students in the age group twenty two and twenty six years, they prefer Doing with 63.3% to Watching with 36.7%. Of the one hundred and two (102) students within the twenty seven to thirty one age group 57.8% prefer Doing to 42.2% who chose Watching. In the age group of thirty two to thirty six, of the ninety three (93) students 58.1% seemed to prefer Doing and 41.9% prefer Watching. The thirty (30) students in the age group thirty seven to forty one 53.3% also prefer Doing and 46.7% prefer Watching. The thirty five (35) students in the forty two to forty six years category, 62.9% preferred Doing and 37.1% preferred Watching with and those twenty (20) students who fall within the greater than forty seventy years category, they preferred 55% Watching with 45% chose Doing. According to Honey and Mumford's learning styles cycle, overall the students tend to be activist (having an experience) rather than reflector (reviewing an experience) on the Kolb's processing continuum.

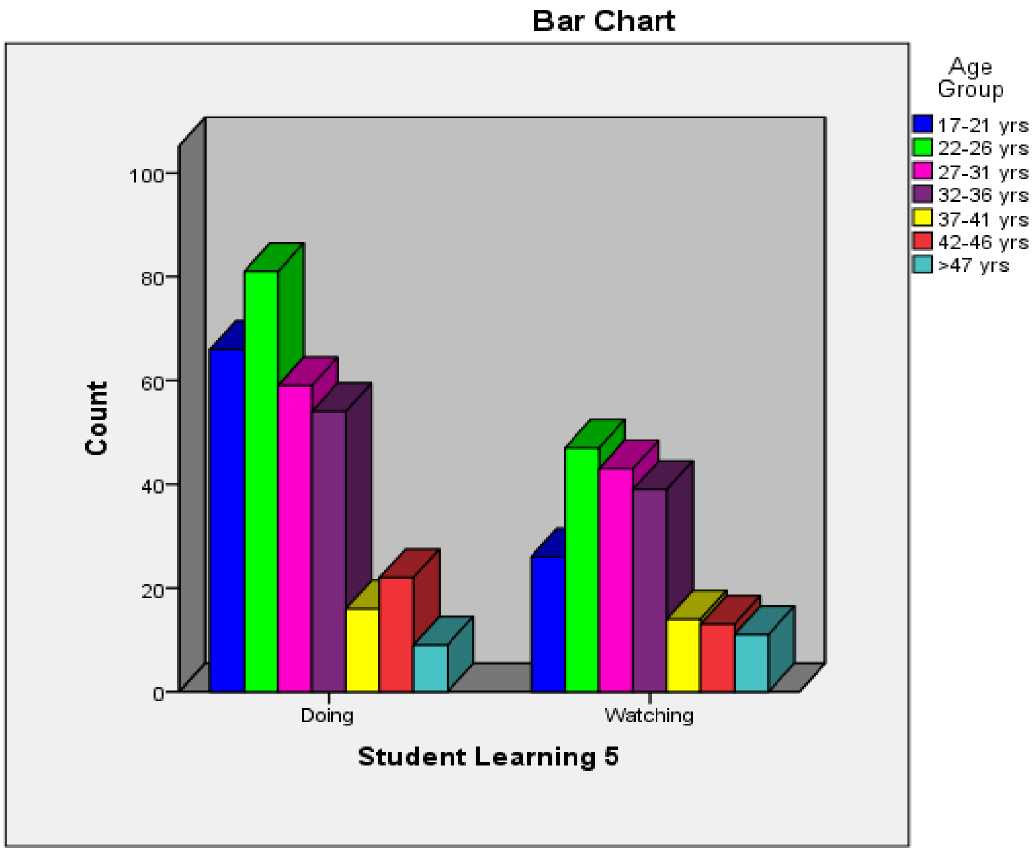


Fig 4.44: Age Group and SL5

The two variables used in this test were Age Group and Student Learning 6: **SL6: Doing** - I like to get involved and to participate. **Watching** - I like to read and observe.

The results of this cross tabulation gave the following:

χ^2 (6) = 8.180, p =0.225; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Age Group is not giving any observable difference for SL6

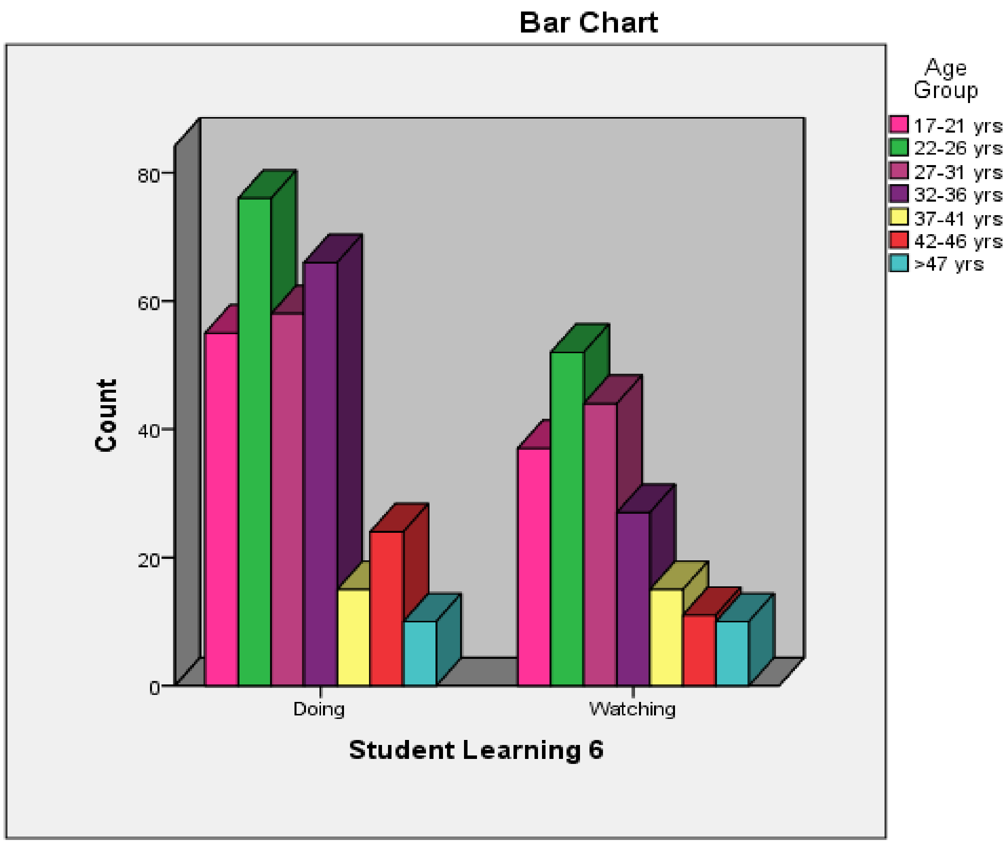


Fig 4.45: Age Group and SL6

In the Age Group, of the five hundred students surveyed, as illustrated in Fig 4.45, overall three hundred and four (304) students prefer Doing accounting for 60.8% which states *that* ***'****I like to get involved and to participate'* to Watching with one hundred and ninety sic students (196) or 39.2% which states that 'I like to read and observe.' Of the ninety two (92) students in the seventeen to twenty one age group prefer Doing with 59.8% to Watching with 40.2%. Of the one hundred and twenty eight (128) students in the age group twenty two and twenty six years, they prefer Doing with 59.4% to Watching with 40.6%. Of the one hundred and two (102) students within the twenty seven to thirty one age group 56.9% prefer Doing to 43.1% who chose Watching. In the age group of thirty two to thirty six, ninety three (93) students 71% also seemed to prefer Doing and 29% preferred Watching. An equal number of the thirty (30) students in the age group thirty seven to forty one chose Doing with 50% as well as Watching with 50%. The thirty five (35) students in the forty two to forty six years category, 68.6% preferred Doing and 31.4% preferred Watching. With the twenty (20) students who fell within the greater than forty seventy years category, there was an equal distribution of students who chose Doing and Watching. According to Honey and Mumford's learning styles cycle, overall the students tend to be activist (having an experience) rather than reflector (reviewing an experience) on the Kolb's processing continuum.

The two variables used in this test were Age Group and Student Learning 7: **SL7: Doing** - I am loud and outgoing. **Watching** - I am quiet and somewhat shy.

The results of this cross tabulation gave the following:

χ^2 (6) = 2.948, p =0.815; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Age Group is not giving any observable difference for SL7.

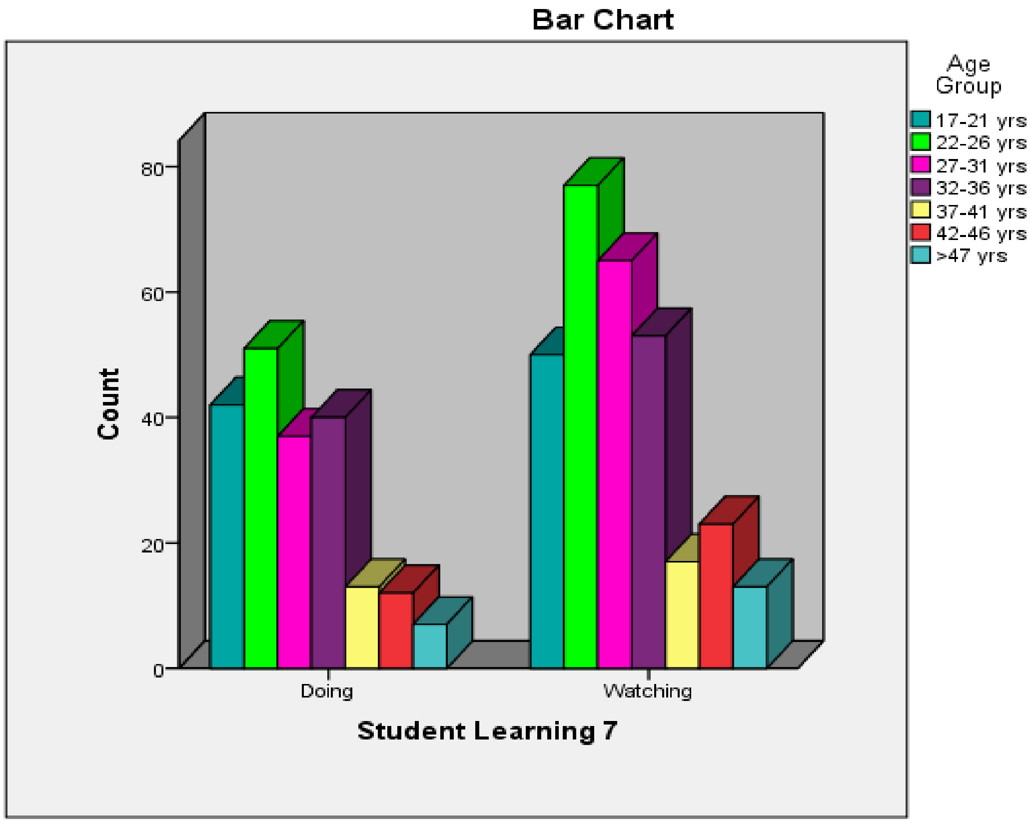


Fig 4.46: Age Group and SL7

In the Age Group, of the five hundred students surveyed, as illustrated in Fig 4.46, overall two hundred and ninety eight (298) students prefer Watching accounting for 59.6% which states that *'I am quiet and somewhat shy'* to Doing with two hundred and two students (202) or 40.4% which states that *'I am loud and outgoing'*. Of the ninety two (92) students in the seventeen to twenty one age group prefer Watching with 54.3% to Doing with 45.7%. Of the one hundred and twenty eight (128) students in the age group twenty two and twenty six years, they prefer Watching with 60.2% to Doing with 39.8%. Of the one hundred and two (102) students within the twenty seven to thirty one age group 63.7% prefer Watching to 36.3% who chose Doing. In the age group of thirty two to thirty six, the ninety three (93) students seemed to prefer Watching with 57% to Doing with 43%. Students in the age group thirty seven to forty one also prefer Watching with 56.7% to Doing with 43.3%. The thirty five (35) students in the forty two to forty six years category, preferred Watching with 65.7% to Doing with 34.3% and those twenty (20) students who fall within the greater than forty seventy years category, they preferred Watching with 65% to Doing with 35% chose. According to Honey and Mumford's learning styles cycle, overall the students tend to be reflectors (reviewing an experience) rather than activists (having an experience) on the Kolb's processing continuum.

The two variables used in this test were Age Group and Student Learning 8: **SL8: Doing** - I make quick and bold decisions. **Watching** - I make cautious and logical decisions

The results of this cross tabulation gave the following:

χ^2 (6) = 7.915, p =0.244; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Age Group is not giving any observable difference for SL8.

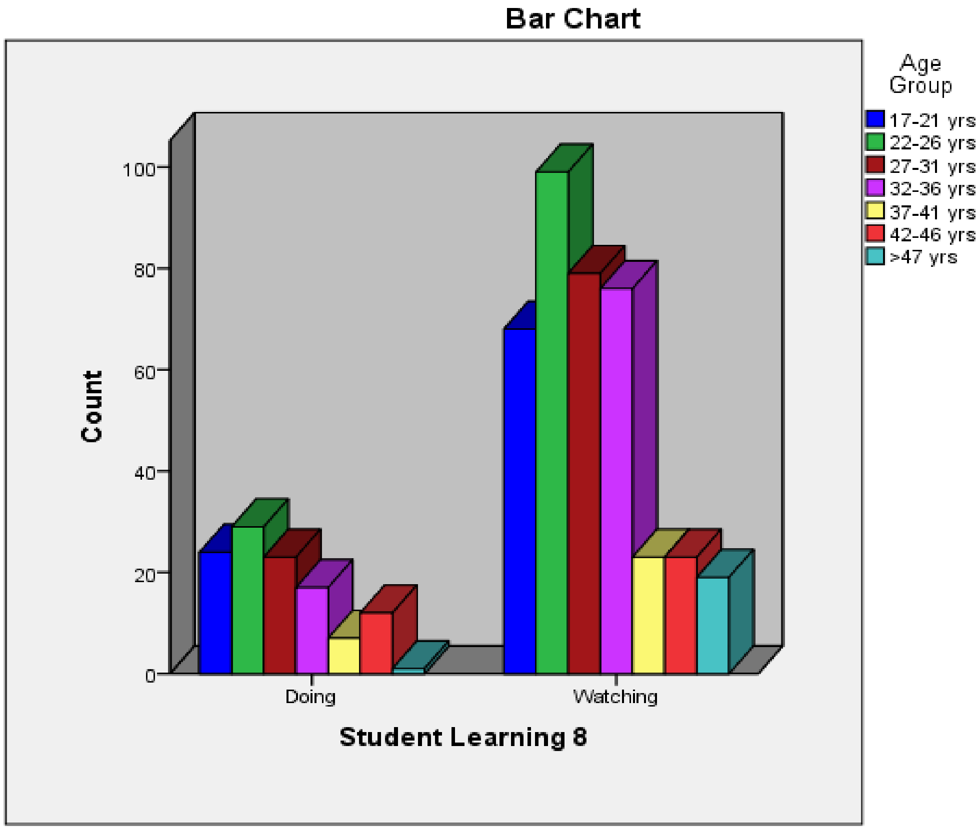


Fig 4.47: Age Group and SL8

In the Age Group, of the five hundred students surveyed, as illustrated in Fig 4.47, overall three hundred and eighty seven (387) students prefer Watching accounting for 77.4% which states that **'***I make cautious and logical decisions'* to Doing with one hundred and thirteen students (113) or 22.6% which states *that 'I make quick and bold decisions'.* Of the ninety two (92) students in the seventeen to twenty one age group prefer Watching with 73.9% to Doing with 26.1%. Of the one hundred and twenty eight (128) students in the age group twenty two and twenty six years, they prefer Watching with 77.3% to Doing with 22.7%. Of the one hundred and two (102) students within the twenty seven to thirty one age group 77.5% prefer Watching to 22.5% who chose Doing. In the age group of thirty two to thirty six, the ninety three

(93) students seemed to prefer Watching with 81.7% to Doing with 18.3%. Students in the age group thirty seven to forty one also prefer Watching with 76.7% to Doing with 23.3%. The thirty five (35) students in the forty two to forty six years category, preferred Watching with 65.7% to Doing with 34.3% and those twenty (20) students who fall within the greater than forty seventy years category, they preferred Watching with 95% to Doing with 5% chose. According to Honey and Mumford's learning styles cycle, overall the students tend to be reflectors (reviewing an experience) rather than activists (having an experience) on the Kolb's processing continuum.

The two variables used in this test were Age Group and Student Learning 9: **SL9: Doing** - I speak fast, while thinking. **Watching** - I speak slowly, after thinking.

The results of this cross tabulation gave the following:

χ^2 (6) = 4.304, p =0.636; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Age Group is not giving any observable difference for SL9.

In the Age Group, of the five hundred students surveyed, as illustrated in Fig 4.48, overall two hundred and seventy three (373) students prefer Doing accounting for 54.6% which states that *'I speak fast, while thinking'* to with two hundred and twenty seven students (227) Watching or 45.4% which states *that 'I speak slowly, after thinking'.* Of the ninety two (92) students in the seventeen to twenty one age group prefer Doing with 60.9% to Watching with 39.1%. Of the one hundred and twenty eight (128) students in the age group twenty two and twenty six years, they prefer Doing with 55.5% to Watching with 44.5%. Of the one hundred and two (102) students within the twenty seven to thirty one age group 52.9% prefer Doing to 47.1% who chose Watching. In the age group of thirty two to thirty six, the ninety three (93) students seemed to prefer Doing with 50.5% to Watching with 49.5%. Students in the age group thirty seven to forty one also prefer Doing with 60% to Watching with 40%. The thirty five (35) students in the forty two to forty six years category, preferred Doing with 54.3% to Watching with 45.7% and those twenty (20) students who fall within the greater than forty seventy years category, they preferred Watching with 60% to Doing with 40% chose. According to Honey and Mumford's learning styles cycle, overall the students tend to be activists (having an experience) rather than reflectors (reviewing an experience) on the Kolb's processing continuum.

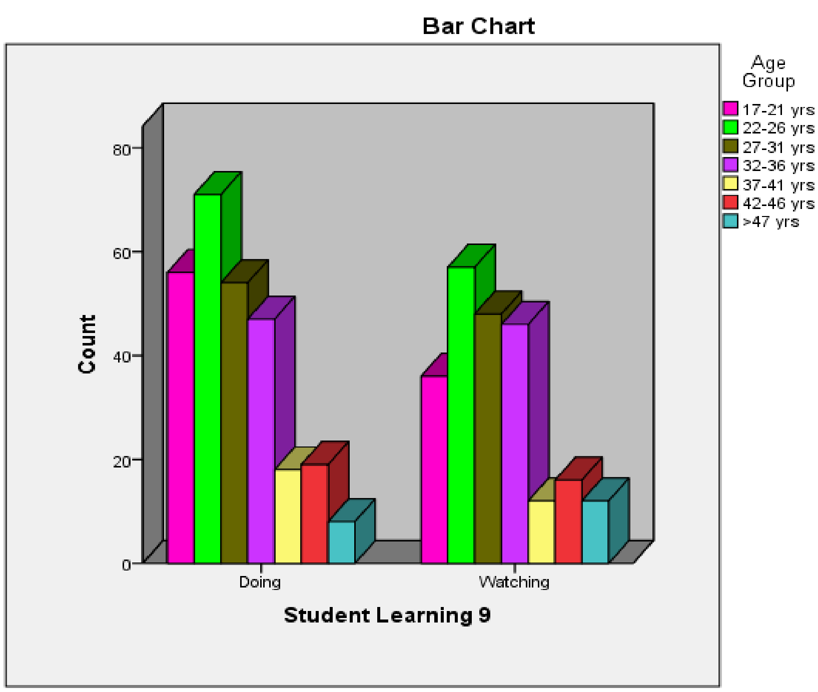


Fig 4.48: Age Group and SL9

In the survey conducted for **SL1** at the start of their study as well as at the present time of study 50.2% of students chose **doing** (I often produce off-the-cuff ideas that at first might seem silly or half-baked) whilst 49.8% chose **watching** (I am thorough and methodical). For **SL2** 50.6% of students were **doing** (I am normally the one who initiates conversations) whilst 49.4% were **watching** (I enjoy watching people) at the start of their study as well as at the present time of the study. When Student Learning 3 was examined it was found that 69.6% of students were **doing** (I am flexible and open minded) whilst 30.4% were **watching** (I am careful and cautious) at both the start and present time of their study. When **SL4** was investigated 49.2% of students chose **doing** (I like to try new and different things without too much preparation) whilst 50.8% chose **watching** (I investigate a new topic or process in depth before trying it) at the start and present time of the study. For **SL5** 61.4% of students elected **doing** (I am happy to have a go at new things) whilst 38.6% chose **watching** (I draw up lists up possible courses of actions when starting a new project) at the start of their study as well as the present time of this study. When SL6 was examined 60.8% of students were **doing** (I like to get involved and to participate) whilst 39.2% were **watching** (I like to read and observe) at both the start and present time of study. For **SL7** 40.4% of students were **doing** (I am loud and outgoing) whilst 59.6% were **watching** (I am quiet and somewhat shy) at both times of the study. When SL8 was examined 22.6% of students were **doing** (I make quick and bold decisions) whilst 77.4% were **watching** (I make cautious and logical decisions) at both the start and present time of their study. For SL9 54.6% of students were **doing** (I speak fast, while thinking) whilst 45.5% were **watching** (I speak slowly, after thinking) at both times of their study.

The main aim Section Two was to investigate whether students preferred **Doing** to **Watching** with reference to the variables area of study, year of study, option of study, age group and IT skills (at the start and at present).

The data collected indicated that a higher percentage of students preferred Doing - *having an experience* and these students fell into Honey and Mumford's learning style category of Activist. Honey and Mumford (2000) explained that in this category meant that the students learn by doing. This type of student has an open-minded approach to learning, involving him/her fully and without basis in new experiences.

There were also a lesser percentage of students who preferred **Watching** - *reviewing an experience*. These students were found to be in the learning category of the Reflector. Honey and Mumford (2000) explained that the reflector learn by observing and thinking about what happened. These students preferred to stand back and view experiences, collecting data and taking time to work towards an appropriate conclusion

4.4 SECTION 3: THINKING AND FEELING

Section 3 (Honey and Mumford (2000)) of this survey was designed to help gain an understanding of students' learning style so that an educator can incorporate the various learning styles into students' daily learning activities.

Pearson's chi-square test of independence was used to show the relationship between two categorical variables. This statistical method was used to assess the goodness of fit between a set of observed values and those expected theoretically. Further to this, Pearson's chi-square distribution along with the critical value and the p value allowed the researcher either to accept or reject the null hypothesis (H_0). The null hypothesis indicates that there is no observable difference in responses between the observed and the expected frequencies and also states that the two variables are independent of each other.

The two variables used for this test were Area of Study and Student Learning10: **SL10: Thinking** - I ask probing questions when learning a new subject. **Feeling** - I am good at picking up hints and techniques from other people.

			Area of Study		Total
			Business	Information Technology	
Student Learning 10	Thinking	Count	**140**	**89**	**229**
		% within Area of Study	47.5%	43.4%	45.8%
	Feeling	Count	**155**	**116**	**271**
		% within Area of Study	52.5%	56.6%	54.2%
Total		Count	**295**	**205**	**500**
		% within Area of Study	100.0%	100.0%	100.0%

Table 4.28: Student Learning 10* Area of Study

In the Area of Study, of the five hundred students surveyed, overall two hundred and twenty nine (229) students prefer Thinking which states *'I ask probing questions when learning a new subject '* 45.8% to Feeling which *states 'I am good at picking up hints and techniques from other people'* with two hundred and seventy one students (271) or 54.2%. From the results in Table 4.28, taking each course into account, the Business Management students prefer Feeling with 52.5% to Thinking with 47.5%. Students pursuing the Information Technology course also prefer Feeling with 56.6% to Thinking with 43.4%.

The results of this cross tabulation gave the following:

$\chi^2(1) = 0.796$, $p = .372$; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Area of Study is not giving any observable difference for SL10. There is no significant margin to indicate that students prefer to conclude from an experience (Thinking) as opposed to planning the next stage (Feeling). According to Honey and Mumford's learning styles cycle, there is no clear balance whether students tend to be theorists (thinking) or pragmatist (feeling) on the processing continuum, as displayed in Fig 4.49 below.

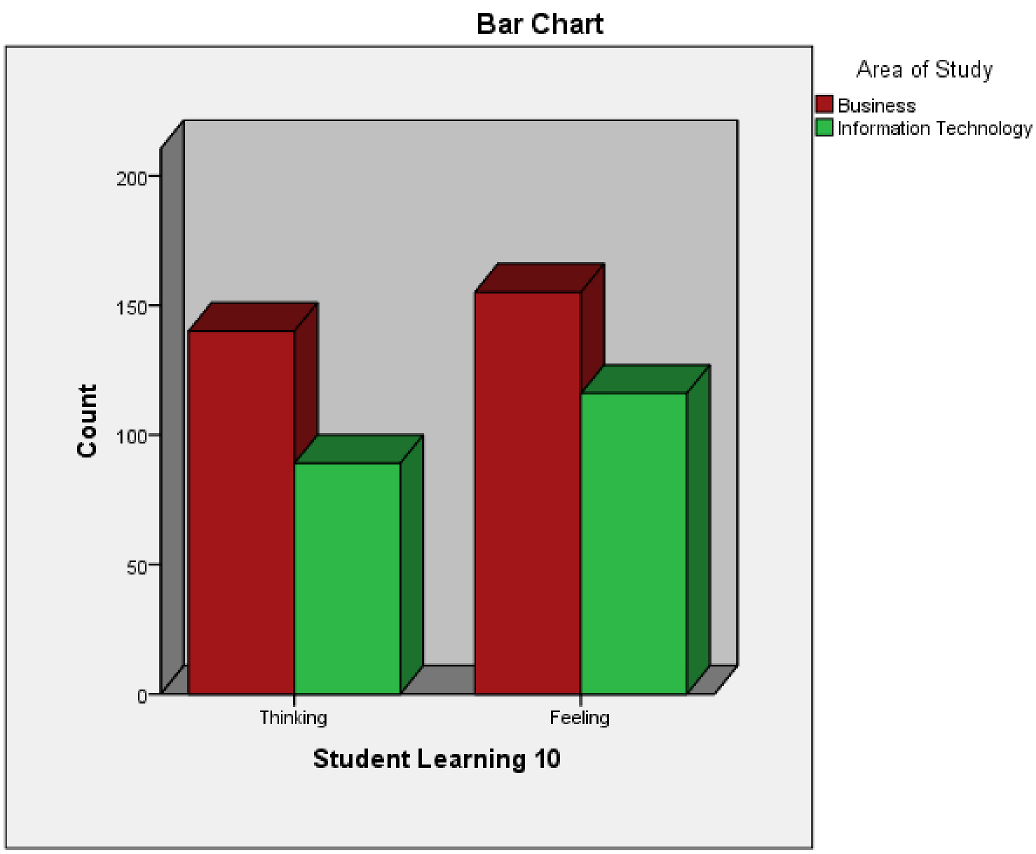


Fig 4.49: Area of Study and SL10

The two variables used for this test were Area of Study and Student Learning11:

SL11: Thinking - I am rational and logical. **Feeling** - I am practical and down to earth.

			Student Learning 11		Total
			Thinking	Feeling	
Area of Study	**Business**	Count	**102**	**193**	**295**
		% within Area of Study	34.6%	65.4%	100.0%
	Information Technology	Count	**91**	**114**	**205**
		% within Area of Study	44.4%	55.6%	100.0%
Total		Count	**193**	**307**	**500**
		% within Area of Study	38.6%	61.4%	100.0%

Table 4.29: Student Learning 11* Area of Study

In the Area of Study, of the five hundred students surveyed, overall one hundred and ninety (193) students chose Thinking which states *'I am rational and logical'* 38.6% to Feeling which states *'I am practical and down to earth '* with three hundred and seven students (307) or 61.4%. However, taking each course into account, the Business Management students prefer Feeling with 65.4% to Thinking with 34.6%. Students pursuing the Information Technology course also prefer Feeling with 55.6% to Thinking with 44.4%, as illustrated in Fig 4.50.

The results of this cross tabulation gave the following:

$\chi^2(1) = 4.915$, $p = .027$; H_0 = rejected

There was an observable difference in responses therefore the null hypothesis, H_0, has been rejected. This indicates that the Area of Study is giving an observable difference for SL11.

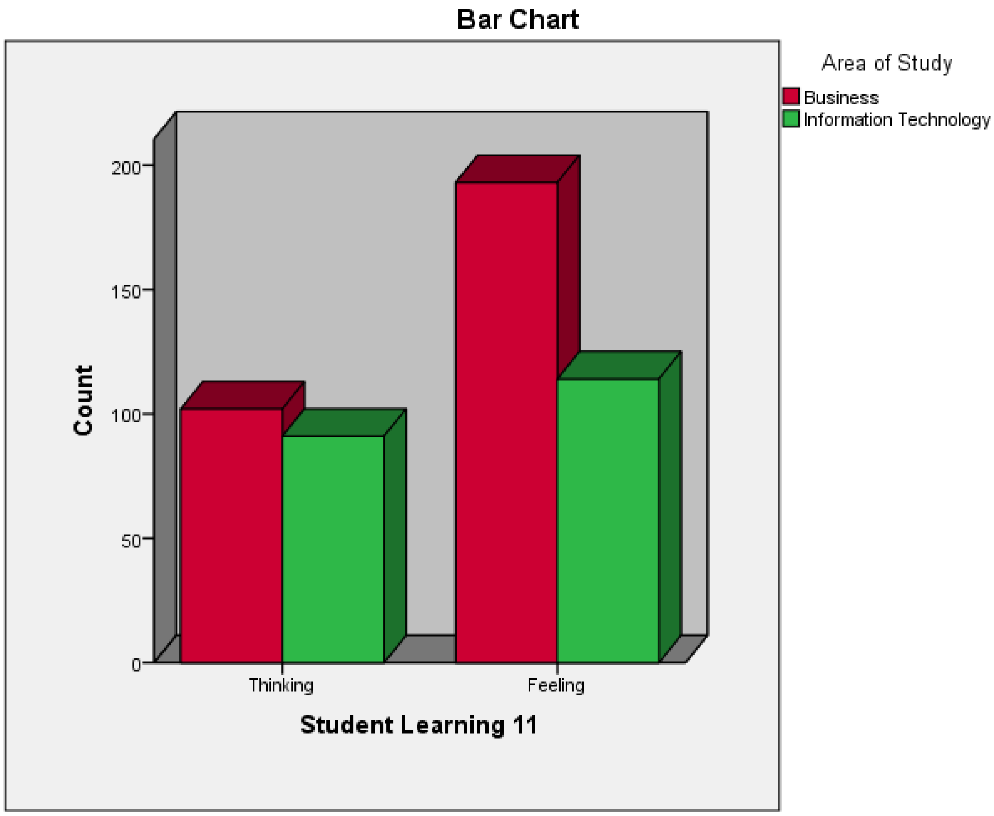


Fig 4.50: Area of Study and SL11

According to Honey and Mumford's learning styles cycle, students tend to be pragmatist (feeling) –' *I am practical and down to earth'* over theorist (thinking) – '*I am rational and logical'* on the processing continuum for SL11.

The two variables used for this test were Area of Study and Student Learning12:

SL12: Thinking - I plan events down to the last detail. **Feeling** - I like realistic, but flexible plans.

			Area of Study		Total
			Business	**Information Technology**	
Student Learning 12	Thinking	Count	**113**	**42**	**155**
		% within S L12	72.9%	27.1%	100.0%
	Feeling	Count	**182**	**163**	**345**
		% within S L12	52.8%	47.2%	100.0%
Total		Count	**295**	**205**	**500**
		% within S L12	59.0%	41.0%	100.0%

Table 4.30: Student Learning 12 * Area of Study

The results of this cross tabulation gave the following:

$\chi^2(1) = 17.951$, $p = .000$; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Area of Study is not giving any observable difference for SL12.

In the Area of Study, of the five hundred students surveyed, overall one hundred and fifty five (155) students chose Thinking which states *'I plan events down to the last detail* 'while three hundred and forty five (345) students preferred feeling which states *'I like realistic, but flexible plans.'* From the results in Table 4.30, taking each course into account, of the one hundred and fifty five students who chose thinking 72.9% were Business Management students whilst 27.1% were studying Information Technology. Of the three hundred and forty five students who chose Feeling 52.8% were Business Management students with the remaining 47.2% pursuing the Information Technology course.

This indicates that students prefer planning the next stage (Feeling) as opposed to conclude from an experience (Thinking). According to Honey and Mumford's learning styles cycle, students tend to or pragmatist (feeling) over theorists (thinking) on the processing continuum for SL12 as displayed in the graph below (Fig 4.51).

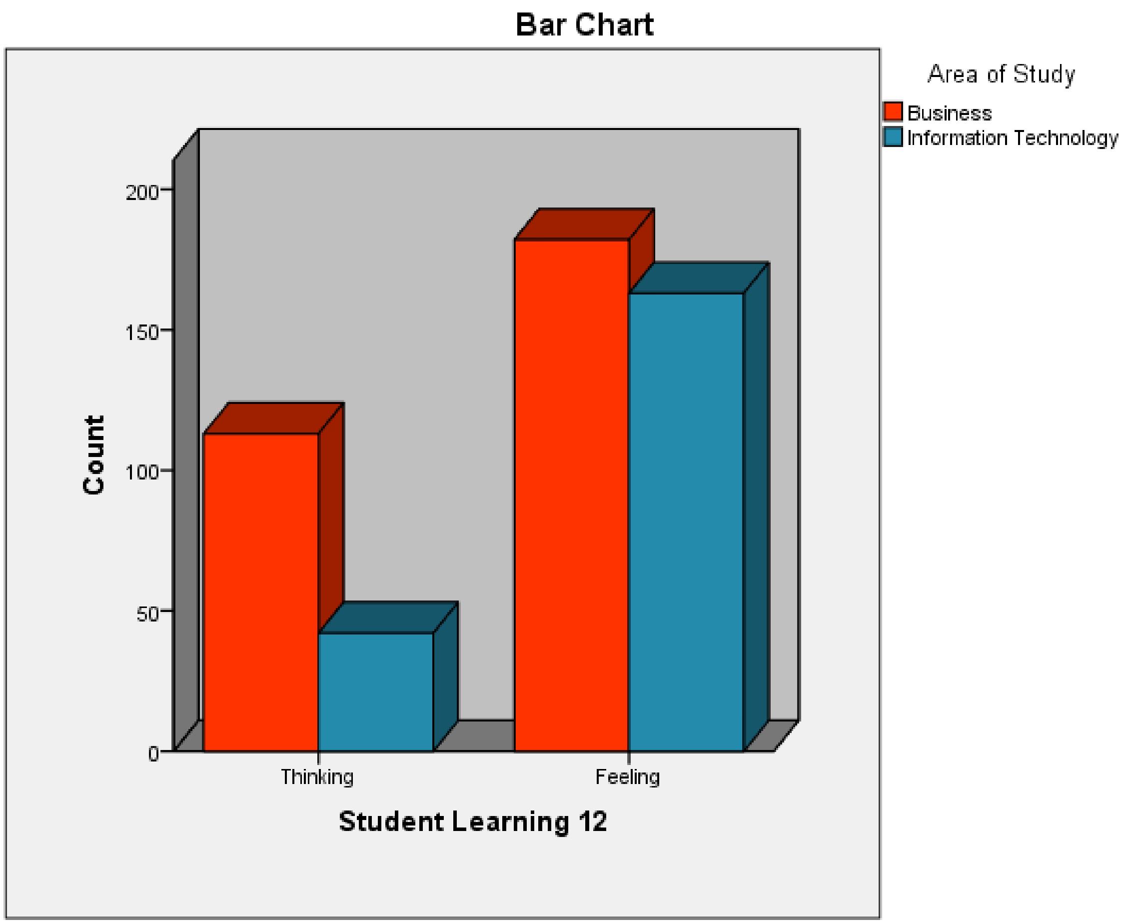


Fig 4.51: Student Learning 12 * Area of Study

The two variables used for this test were Area of Study and Student Learning13:

SL13: Thinking - I like to know the right answers before trying something new. **Feeling** - I try things out by practicing to see if they work.

The results of this cross tabulation gave the following:

$\chi^2(1) = 6.485$, p =.011; H_0 = rejected

There was an observable difference in responses therefore the null hypothesis, H_0, has been rejected. This indicates that the Area of Study is giving an observable difference for SL13.

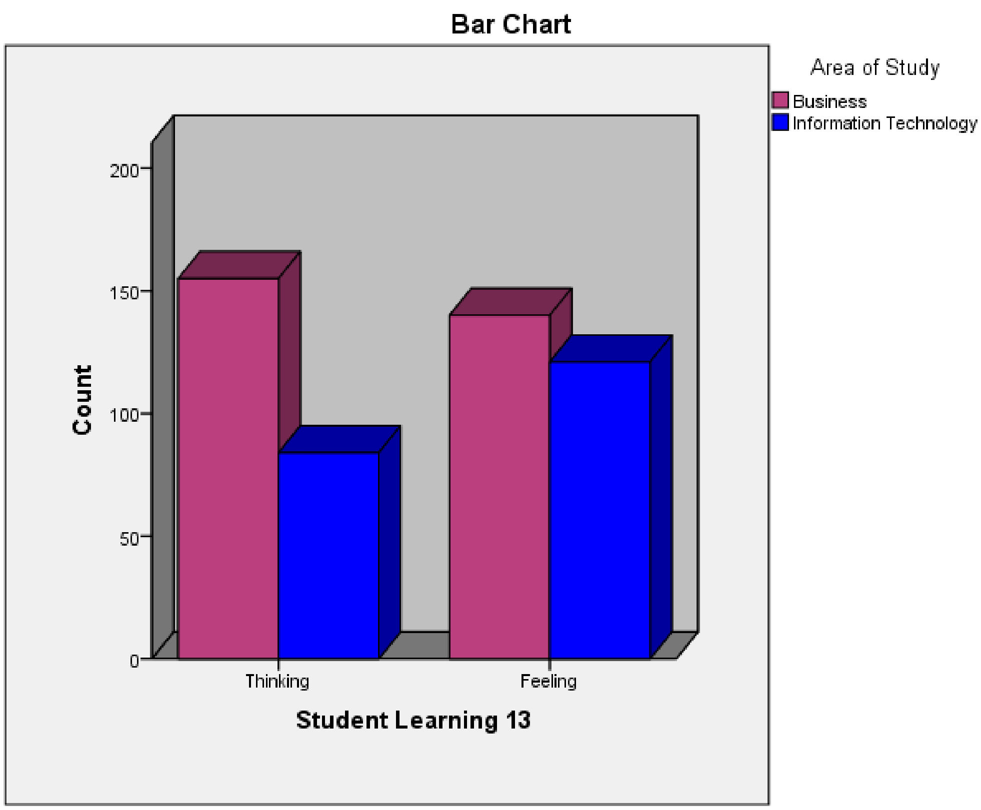


Fig 4.52: Area of Study and SL13

In the Area of Study, of the five hundred students surveyed, overall two hundred and thirty nine (239) students chose Thinking which states *'I like to know the right answers before trying something new'* while two hundred and sixty one (261) students preferred Feeling which states *'I try things out by practicing to see if they work'.* Taking each course into account, of the two hundred and thirty nine (239) students who chose thinking 64.9% were Business Management students whilst 35.1% were studying Information Technology. Of the two hundred and sixty one (261) students who chose Feeling, 53.6% were Business Management students with the remaining 46.4% pursuing the Information Technology course.

This indicates that students prefer planning the next stage (Feeling) as opposed to conclude from an experience (Thinking). According to Honey and Mumford's learning styles cycle tend to be pragmatist (feeling) over theorists (thinking) on the processing continuum when SL13 is considered against Area of Study as illustrated in Table 4.31 below.

			Area of Study		Total
			Business	Information Technology	
Student Learning 13	Thinking	Count	155	84	239
	Feeling	Count	140	121	261
Total		Count	295	205	500

Table 4.31: Student Learning 13* Area of Study

The two variables used for this test were Area of Study and Student Learning14:

SL14: Thinking - I analyze reports to find the basic assumptions and inconsistencies. **Feeling** - I rely upon others to give me the basic gist of reports.

			Student Learning 14		Total
			Thinking	**Feeling**	
Area of Study	**Business**	Count	**225**	**70**	**295**
		% within Area of Study	76.3%	23.7%	100.0%
	Information Technology	Count	**162**	**43**	**205**
		% within Area of Study	79.0%	21.0%	100.0%
Total		Count	**387**	**113**	**500**
		% within Area of Study	77.4%	22.6%	100.0%

Table 4**.**32**:** Student Learning 14* Area of Study

The results of this cross tabulation gave the following:

$\chi^2(1) = 0.524$, p =.0.469; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Area of Study is not giving any observable difference for SL14.

In the Area of Study, of the five hundred students surveyed, three hundred and eighty seven (387) students chose Thinking which states *'I analyze reports to find the basic assumptions and inconsistencies'* to feeling with one hundred and thirteen (113) students which states that '*I rely upon others to give me the basic gist of reports'.* The above table 4.32 illustrates that of the two hundred and ninety five (295) Business management students surveyed 76.3% preferred Thinking whilst 23.7% preferred feeling. Of the two hundred and five (205) Information Technology students surveyed 79% preferred Thinking over feeling.

This indicates that students prefer to conclude from an experience (Thinking) over planning the next stage (Feeling). According to Honey and Mumford's learning styles cycle, students tend to theorists (thinking) over pragmatist (feeling) on the processing continuum for SL14 as displayed in the graph below Fig 4.53.

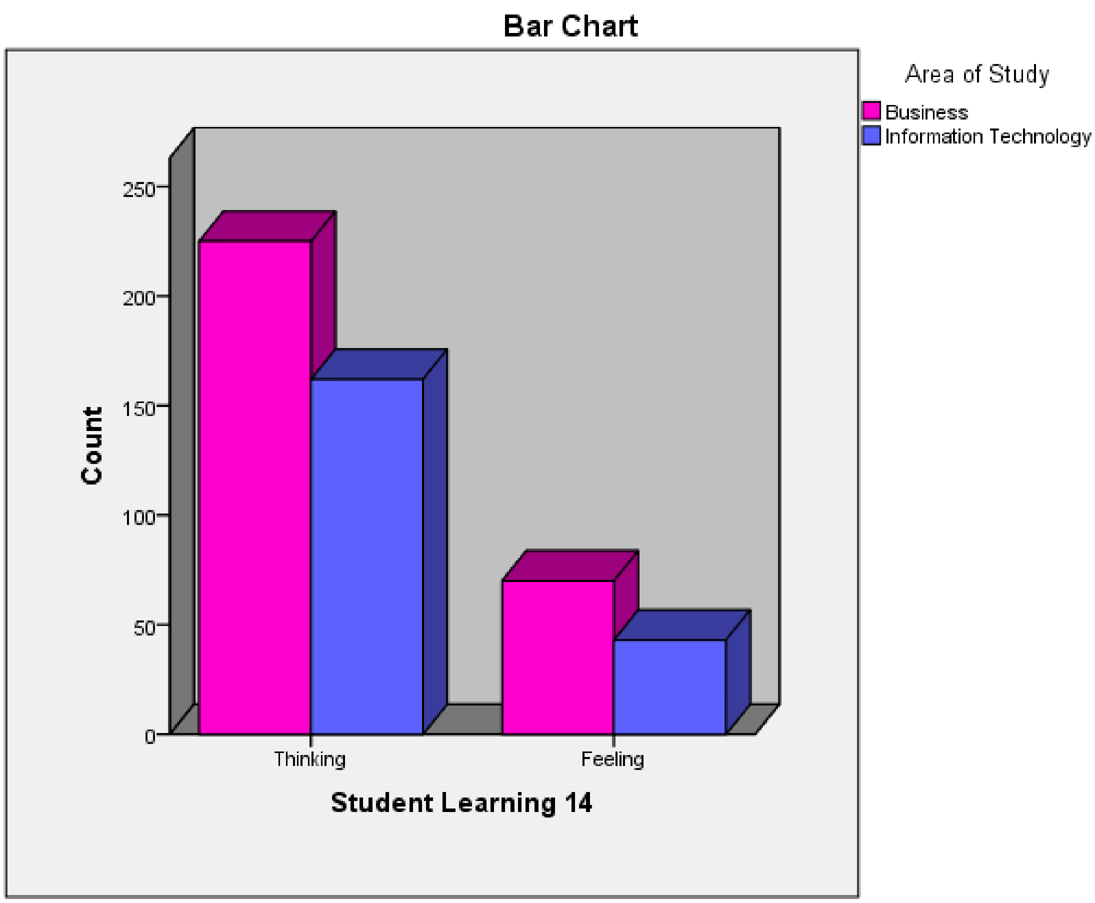


Fig 4.53: Area of Study and SL14

The two variables used for this test were Area of Study and Student Learning15:

SL15: Thinking - I prefer working alone. **Feeling** - I enjoy working with others.

			Area of Study		Total
			Business	**Information Technology**	
Student Learning 15	**Thinking**	Count	**180**	**111**	**291**
		% within SL 15	61.9%	38.1%	100.0%
	Feeling	Count	**115**	**94**	**209**
		% within SL 15	55.0%	45.0%	100.0%
Total		Count	**295**	**205**	**500**
		% within SL 15	59.0%	41.0%	100.0%

Table 4**.**33**:** Student Learning 15* Area of Study

The results of this cross tabulation gave the following:

$\chi^2(1) = 0.2.347$, p =.0.126; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Area of Study is not giving any observable difference for SL15.

In the Area of Study, of the five hundred students surveyed, overall two hundred and ninety one (291) students chose Thinking which states *'I prefer working alone'* while two hundred and nine (209) students preferred feeling which states 'I enjoy working with others'. Results from Table 4.33 indicate that in taking each course into account, of the one hundred and fifty five students who chose thinking 61.9% were Business Management students whilst 38.1% were students studying Information Technology. Of the two hundred and nine (209) students who chose Feeling 55% were Business Management students with the remaining 45% pursuing the Information Technology course.

This indicates that students prefer to conclude from an experience (Thinking). as opposed to planning the next stage (Feeling) According to Honey and Mumford's learning styles cycle, students tend to theorists (thinking) over pragmatist (feeling) on the processing continuum as displayed in the graph below.

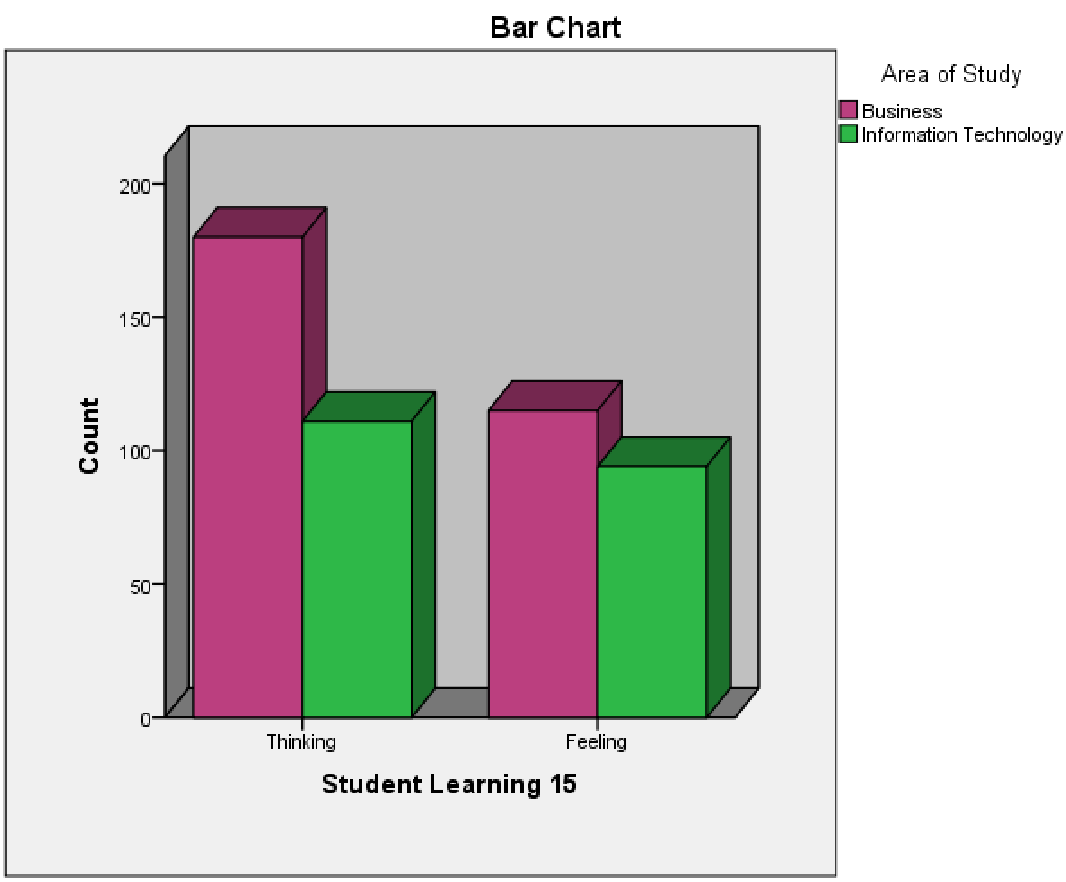


Fig 4.54: Area of Study and SL15

The two variables used for this test were Area of Study and Student Learning16:

SL16: Thinking - Others would describe me as serious, reserved, and formal. **Feeling** - Others would describe me as verbal, expressive, and informal.

			Area of Study		Total
			Business	Information Technology	
Student Learning 16	Thinking	Count	161	102	263
		Expected Count	155.2	107.8	263.0
	Feeling	Count	134	103	237
		Expected Count	139.8	97.2	237.0
Total		Count	295	205	500
		Expected Count	295.0	205.0	500.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.127[a]	1	.288
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 97.17.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.047	.288
	Cramer's V	.047	.288
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.34: Student Learning 16* Area of Study

The results of this cross tabulation gave the following:

$\chi^2(1) = 1.127$, p =.0.288; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Area of Study is not giving any observable difference for SL16.

In the Area of Study, of the five hundred students surveyed, overall two hundred and sixty three (263) students chose Thinking which states *'Others would describe me as serious, reserved, and formal'* while two hundred and thirty seven (237) students preferred feeling which states *'Others would describe me as verbal, expressive, and informal'*. Results from Table 4.34 indicate that when each course was taken into account, of the two hundred and sixty three (263) students who chose thinking 61.2% were Business Management students whilst 38.8% were students studying Information Technology. Of the two hundred and thirty seven (237) students who chose Feeling 56.5% were Business Management students with the remaining 43.5% were pursuing the Information Technology course.

This indicates that students prefer to conclude from an experience (Thinking) as opposed to planning the next stage (Feeling) According to Honey and Mumford's learning styles cycle, students tend to theorists (thinking) over pragmatist (feeling) on the processing continuum as displayed in the graph below.

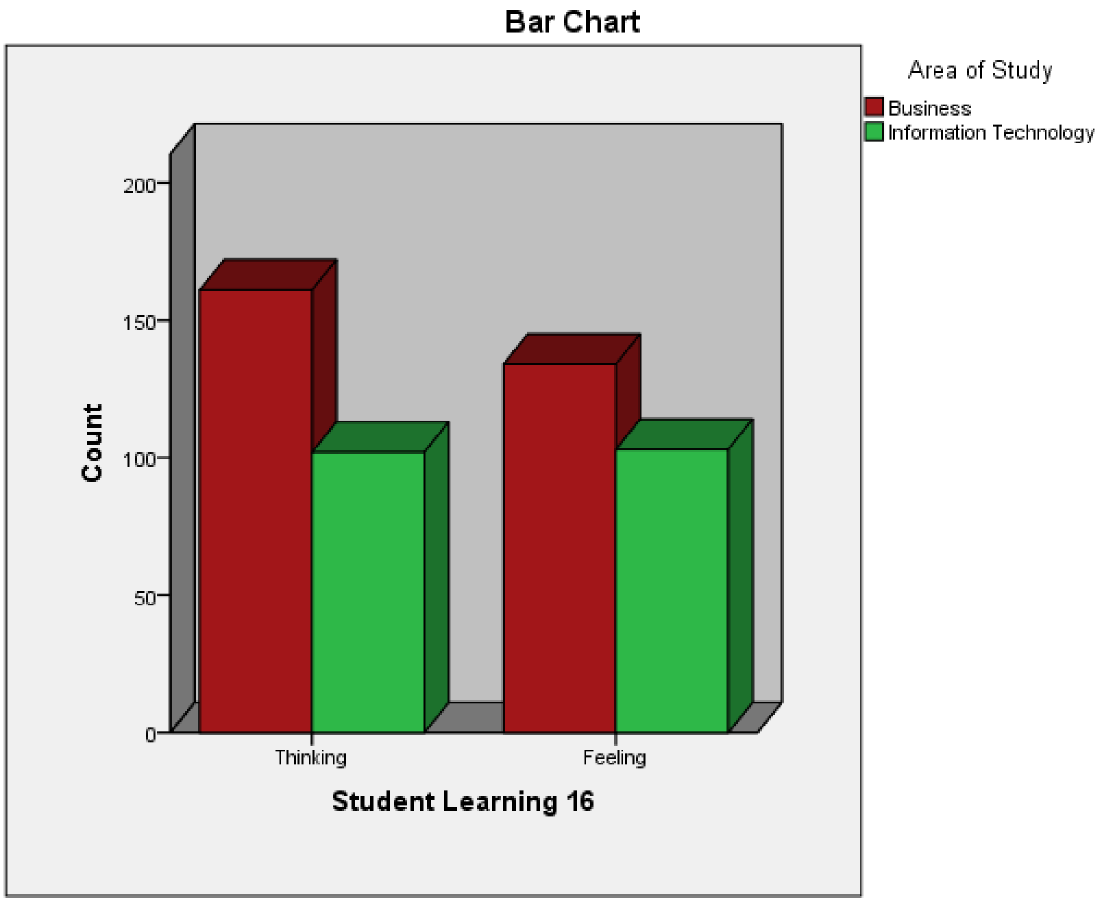


Fig 4.55: Area of Study and SL16

The two variables used for this test were Area of Study and Student Learning17:

SL17: Thinking - I use facts to make decisions. **Feeling** - I use feelings to make decisions.

The results of this cross tabulation gave the following:

$\chi^2(1) = 0.463$, $p = 0.496$; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Area of Study is not giving any observable difference for SL17.

			Area of Study		Total
			Business	**Information Technology**	
Student Learning 17	**Thinking**	Count	**224**	**161**	**385**
		% within S17	58.2%	41.8%	100.0%
	Feeling	Count	**71**	**44**	**115**
		% within S17	61.7%	38.3%	100.0%
Total		Count	**295**	**205**	**500**
		% within S17	59.0%	41.0%	100.0%

Table 4.35: Student Learning 17* Area of Study

In the Area of Study, of the five hundred students surveyed, overall three hundred and eighty five (385) students chose Thinking which states *'I use facts to make decisions'* while one hundred and fifteen (115) students preferred feeling which states *'I use feelings to make decisions'*. Results from Table 4.35 indicate that when each course was taken into account, of the three hundred and eighty five students who chose thinking 58.2% were Business Management students whilst 41.8% were students studying Information Technology. Of the two one hundred and fifteen students who chose Feeling 61.7% were Business Management students with the remaining 38.3% were pursuing the Information Technology course.

This indicates that students prefer to conclude from an experience (Thinking) as opposed to planning the next stage (Feeling) According to Honey and Mumford's learning styles cycle, students tend to theorists (thinking) over pragmatist (feeling) on the processing continuum as displayed in the graph below.

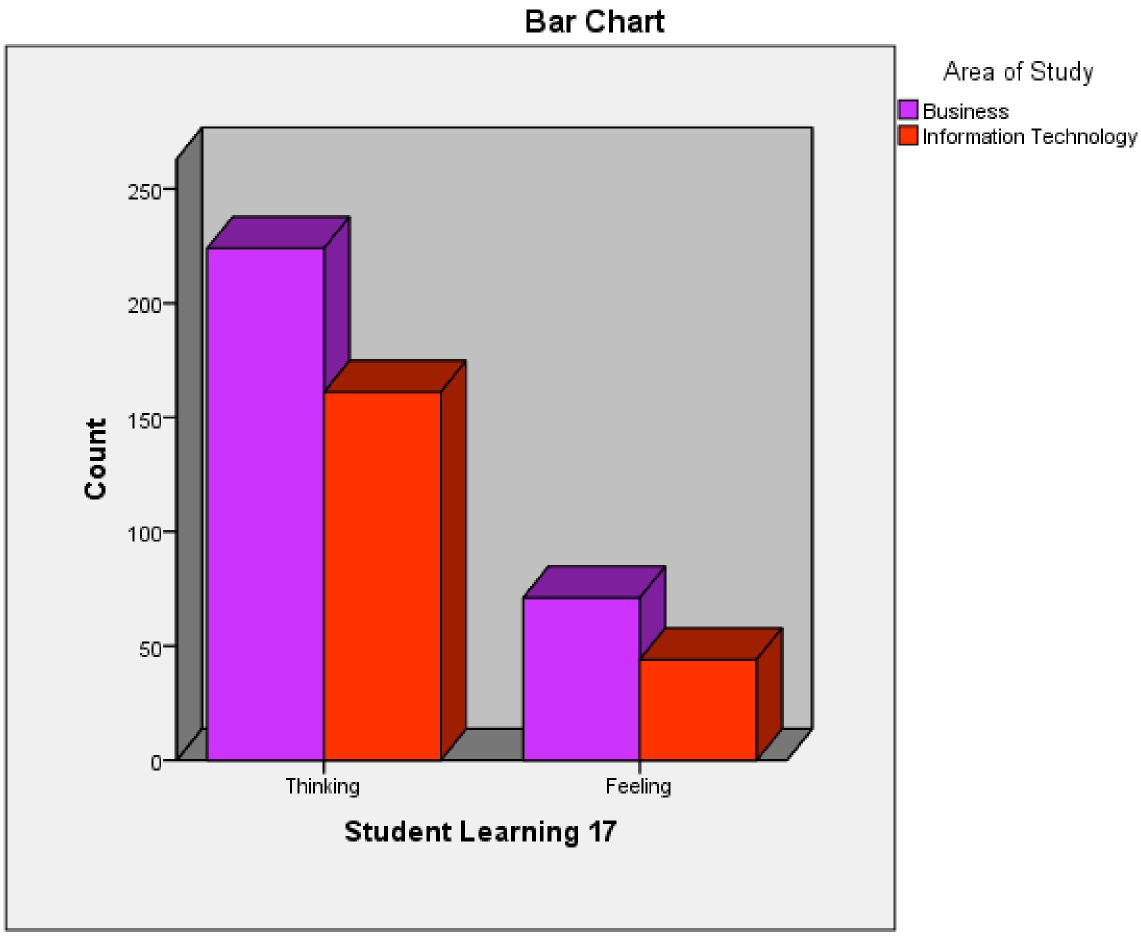


Fig 4.56: Area of Study and SL17

The two variables used for this test were Area of Study and Student Learning18:

SL18: Thinking - I am difficult to get to know. **Feeling** - I am easy to get to know.

The results of this cross tabulation gave the following:

$\chi^2(1) = 1.557$, $p = 0.212$; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Area of Study is not giving any observable difference for SL18.

			Area of Study		Total
			Business	**Information Technology**	
Student Learning 18	**Thinking**	Count	99	58	157
		% within SL18	63.1%	36.9%	100.0%
	Feeling	Count	196	147	343
		% within SL18	57.1%	42.9%	100.0%
Total		Count	295	205	500
		% within SL 18	59.0%	41.0%	100.0%

Table 4.36: Student Learning 18 * Area of Study

In the Area of Study, of the five hundred students surveyed, overall three hundred and forty three (343) students chose Feeling which states ' I am easy to get to know' while one hundred and fifty seven (157) students preferred thinking which states *'I am difficult to get to know'*. Results from Table 4.36 when each course was taken into account, of one hundred and fifty seven students who chose thinking 63.1% were Business Management students whilst 36.9% were students studying Information Technology. Of the two three hundred and forty three students who chose Feeling 57.1% were Business Management students with the remaining 42.9% were students pursuing the Information Technology course.

This indicates that students prefer to planning the next stage (Feeling) as opposed to conclude from an experience (Thinking) to According to Honey and Mumford's learning styles cycle, students tend to pragmatist (feeling) over theorists (thinking) over on the processing continuum for SL18 as displayed in the graph below, Fig 4.57..

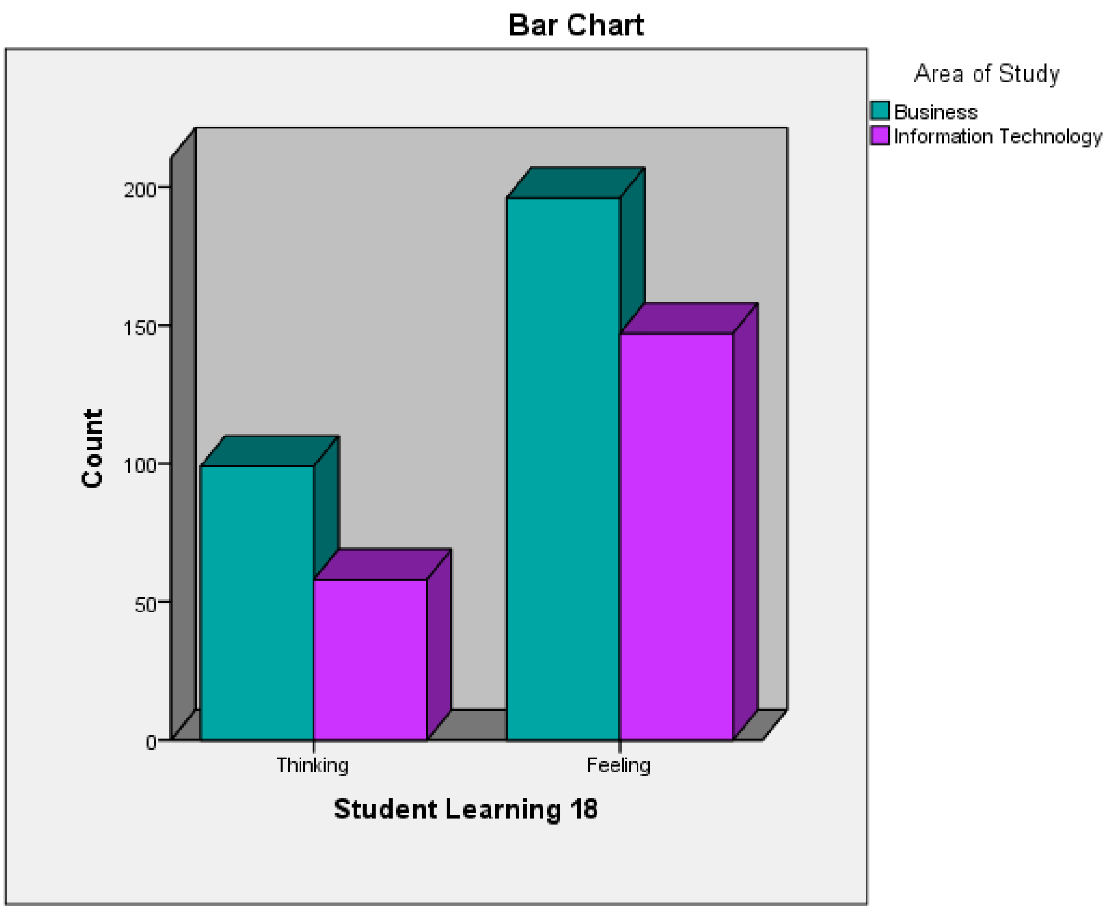


Fig 4.57: Area of Study and SL18

The two variables used for this test were Year of Study and SL10

Student Learning 10 (SL10): Thinking - I ask probing questions when learning a new subject. **Feeling** - I am good at picking up hints and techniques from other people.

			Year of Study					Total
			Year 1	Year 2	Year 3	MBA	MSc	
Student Learning 10	Thinking	Count	63	36	79	33	18	**229**
		Expected Count	71.0	33.9	78.3	30.7	15.1	**229.0**
			40.6%	48.6%	46.2%	49.3%	54.5%	**45.8%**
	Feeling	Count	92	38	92	34	15	**271**
		Expected Count	84.0	40.1	92.7	36.3	17.9	**271.0**
			59.4%	51.4%	53.8%	50.7%	45.5%	**54.2%**
Total		Count	155	74	171	67	33	**500**
		Expected Count	155.0	74.0	171.0	67.0	33.0	**500.0**

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.251[a]	4	.517
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 15.11.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.081	.517
	Cramer's V	.081	.517
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.37: Student Learning 10* Year of Study

In the Year of Study, of the five hundred students surveyed, 45.8% or two hundred and twenty nine (229) students prefer Thinking which states *'I ask probing questions when learning a new subject '*to Feeling which *states 'I am good at picking up hints and techniques from other people'* with two hundred and seventy one students (271) or 54.2%.

Table 4.37 above illustrates that of the one hundred and fifty five (155) students enrolled in Year 1 (Business Management and Information Technology courses) prefer feeling with 59.4% to thinking with 40.6%. Of the seventy four (74) students in Year 2 degree courses, they prefer feeling with 51.4% to thinking with 48.6%. Of the one hundred and seventy one (171) students in the Year 3 degree courses, they prefer feeling with 53.8% to thinking with 46.2%. Of the sixty seven (67) students in MBA post graduate course, there is no significant margin to indicate that students prefer to planning the next stage (Feeling) as opposed to conclude from an experience (Thinking). Students chose feeling with 50.7% and 49.3% chose thinking. Of the thirty three (33) students in MSc post graduate course, 54.5% preferred Thinking while 45.5% chose feeling. According to Honey and Mumford's learning styles cycle, According to Honey and Mumford's learning styles cycle, there is no clear balance whether students tend to be theorists (thinking) or pragmatist (feeling) on the processing continuum.

The results of this cross tabulation gave the following:

$\chi^2(4) = 3.251$, $p = .517$; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Year of Study is not giving any observable difference for SL10. There is no significant margin to indicate that students prefer to conclude from an experience (Thinking) as opposed to planning the next stage (Feeling). According to Honey and Mumford's learning styles cycle, there is no clear balance whether students tend to be theorist (thinking) or pragmatist (feeling) on the processing continuum as illustrated in the graph below, Fig 4.58.

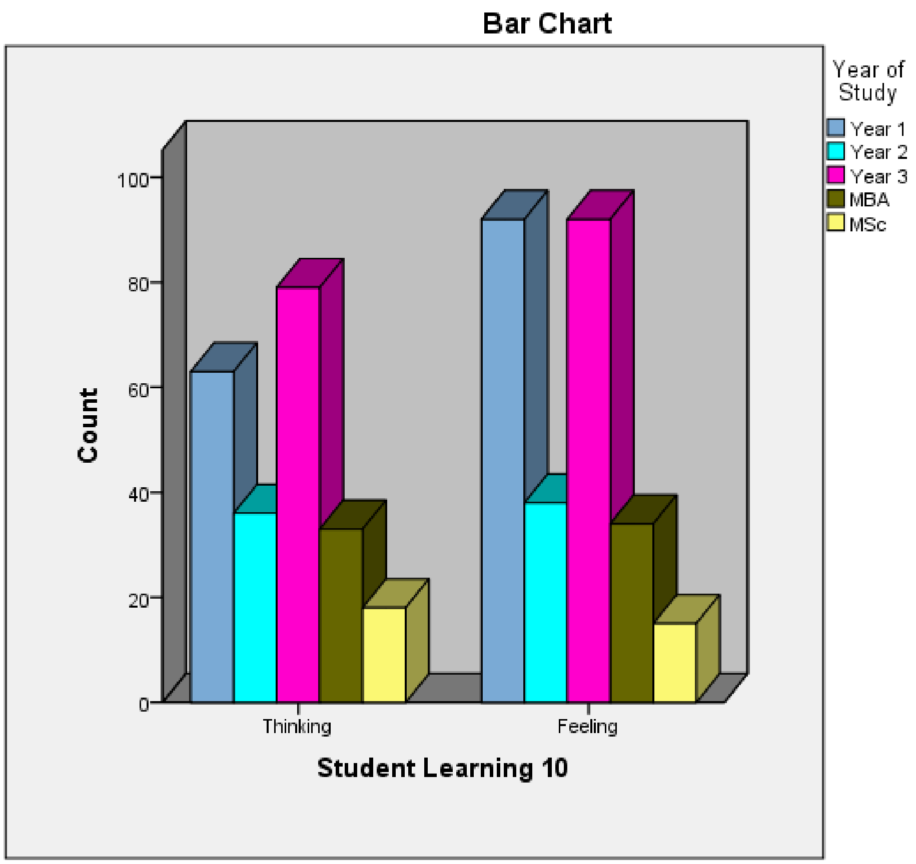


Fig 4.58: Year of Study and SL10

Student Learning 11 (SL11): Thinking - I am rational and logical. **Feeling** - I am practical and down to earth.

The two variables used for this test were Year of Study and SL11 as stated above.

			Year of Study					Total
			Year 1	Year 2	Year 3	MBA	MSc	
Student Learning 11	Thinking	Count	55	19	73	29	17	**193**
		Expected Count	59.8	28.6	66.0	25.9	12.7	**193.0**
		%	35.5%	25.7%	42.7%	43.3%	51.5%	**38.6%**
	Feeling	Count	100	55	98	38	16	**307**
		Expected Count	95.2	45.4	105.0	41.1	20.3	**307.0**
		%	64.5%	74.3%	57.3%	56.7%	48.5%	**61.4%**
Total		Count	155	74	171	67	33	**500**
		Expected Count	155.0	74.0	171.0	67.0	33.0	**500.0**

Table 4**.**38**:** Student Learning 11* Year of Study

The results of this cross tabulation gave the following:

$\chi^2(4) = 10.000$, $p = .04$; H_0 = rejected

There was an observable difference in responses therefore the null hypothesis, H_0, has been rejected. This indicates that the Year of Study is giving an observable difference for SL11.

In the Year of Study, of the five hundred students surveyed, overall one hundred and ninety (193) students - 38.6% - chose Thinking which states *'I am rational and logical'* to Feeling which states *'I am practical and down to earth '* with three hundred and seven students (307) or 61.4%.

Table 4.38 above illustrates that of the one hundred and fifty five (155) students enrolled in Year 1 (Business Management and Information Technology courses) prefer feeling with 64.5% to thinking with 35.5%. Of the seventy four (74) students in Year 2 degree courses, they prefer feeling with 74.3% to thinking with 25.7%. Of the one hundred and seventy one (171) students in the Year 3 degree courses, they prefer feeling with 57.3% to thinking with 42.7%. Of the sixty seven (67) students in MBA post graduate course, Students chose feeling with 56.7% and 43.3% chose thinking. Of the thirty three (33) students in MSc post graduate course, there is no significant margin to indicate that students prefer to planning the next stage (Feeling) as opposed to conclude from an experience (Thinking). 51.5% chose Thinking while 48.5% chose feeling. According to Honey and Mumford's learning styles cycle, students tend to be pragmatist (feeling) over theorist (thinking) on the processing continuum for SL11 as seen in the following graph. There is a strong indication that students prefer to plan the next stage (Feeling) as opposed to conclude from an experience (Thinking)

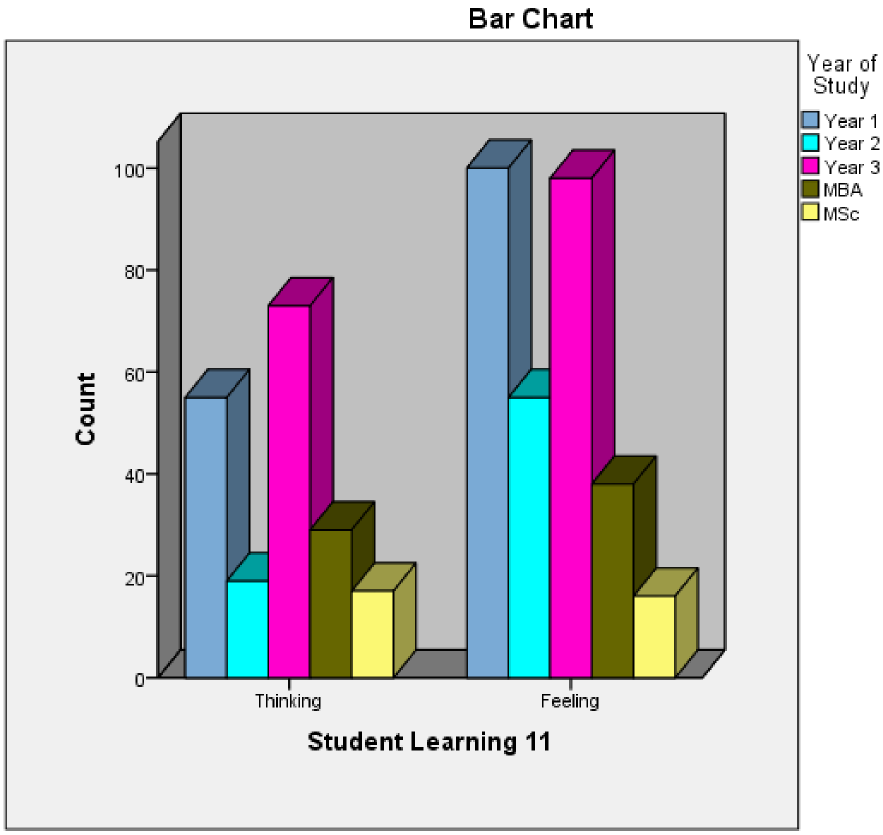


Fig 4.59: Year of Study and SL11

Student Learning 12 (SL12): Thinking - I plan events down to the last detail. **Feeling** - I like realistic, but flexible plans.

The two variables used for this test were Year of Study and SL12 as stated above.

The results of this cross tabulation gave the following:

$\chi^2(4) = 7.026$, p =.135; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Year of Study is not giving any observable difference for SL12.

			Year of Study					Total
			Year 1	Year 2	Year 3	MBA	MSc	
Student Learning 12	**Thinking**	Count	53	22	47	27	6	**155**
		%	34.2%	29.7%	27.5%	40.3%	18.2%	**31.0%**
	Feeling	Count	102	52	124	40	27	**345**
		%	65.8%	70.3%	72.5%	59.7%	81.8%	**69.0%**
Total		Count	155	74	171	67	33	**500**
								100%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.026[a]	4	.135
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 10.23.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.119	.135
	Cramer's V	.119	.135
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.39: Student Learning 12* Year of Study

In the Year of Study, of the five hundred students surveyed, overall one hundred and fifty five (155) students chose Thinking which states *'I plan events down to the last detail'* which accounts for 31% of the students while 69% or three hundred and forty five students (345) chose Feeling which states *'I like realistic, but flexible plans*'.

The table above illustrates that of the one hundred and fifty five (155) students enrolled in Year 1 (Business Management and Information Technology courses) prefer feeling with 65.8% to thinking with 34.2%. Of the seventy four (74) students in Year 2 degree courses, they prefer feeling with 70.3% to thinking with 29.7%. Of the one hundred and seventy one (171) students in the Year 3 degree courses, they prefer feeling with 72.5% to thinking with 27.5%. Of the sixty seven (67) students in MBA post graduate course, students preferred feeling with 59.7% while 40.3% chose thinking. Of the thirty three (33) students in MSc post graduate course, 18.2% chose Thinking while 81.8% preferred feeling. According to Honey and Mumford's learning styles cycle, there is no clear balance whether students tend to be pragmatist (feeling) over theorist (thinking) on the processing continuum for SL12 as illustrated in the graph below.

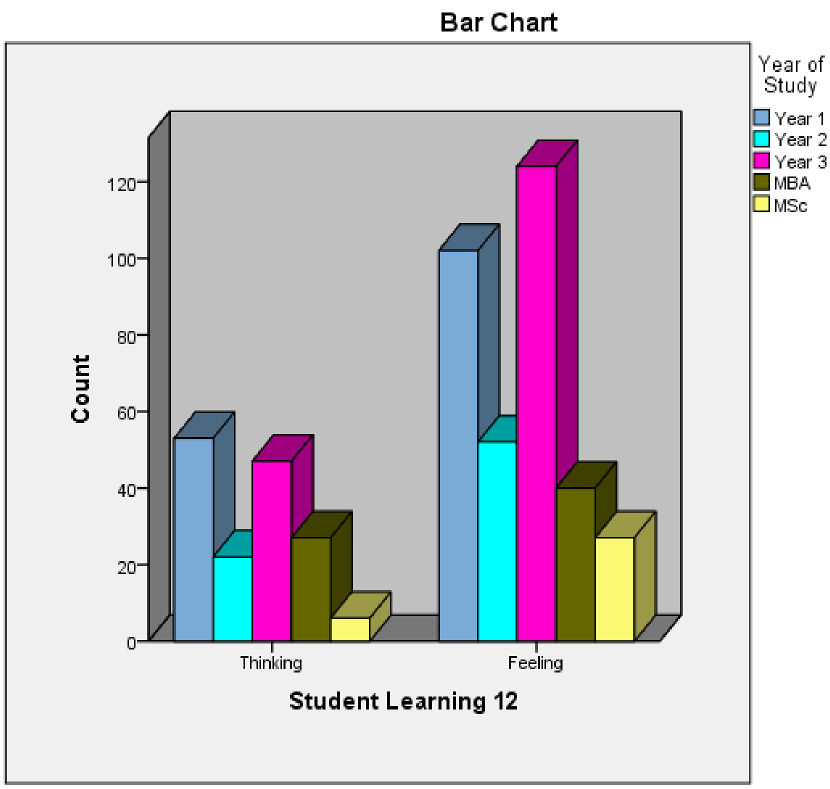


Fig 4.60: Year of Study and SL12

Student Learning 13 (SL13): Thinking - I like to know the right answers before trying something new. **Feeling** - I try things out by practicing to see if they work.

The two variables used for this test were Year of Study and SL13 as stated above.

			Year of Study					Total
			Year 1	Year 2	Year 3	MBA	MSc	
Student Learning 13	**Thinking**	Count	76	31	77	41	14	**239**
		Expected Count	74.1	35.4	81.7	32.0	15.8	**239.0**
	Feeling	Count	79	43	94	26	19	**261**
		Expected Count	80.9	38.6	89.3	35.0	17.2	**261.0**
Total		Count	155	74	171	67	33	**500**
		Expected Count	155.0	74.0	171.0	67.0	33.0	**500.0**

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.855[a]	4	.144
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 15.77.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.117	.144
	Cramer's V	.117	.144
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 4**.**40**:** Student Learning 13 * Year of Study

The results of this cross tabulation gave the following:

$\chi^2(4) = 6.888$, $p = .144$; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Year of Study is not giving any observable difference for SL13.

In the Year of Study, of the five hundred students surveyed, overall two hundred and thirty nine (239) students chose Thinking which states *'I like to know the right answers before trying something new*' which accounted for 47.8% while 52.2% or two hundred and sixty one students (261) chose Feeling which states *'I try things out by practicing to see if they work '*.

Table 4.40 above illustrates that of the one hundred and fifty five (155) students enrolled in Year 1 (Business Management and Information Technology courses) there is no significant margin to indicate that students prefer to conclude from an experience (Thinking) as opposed to planning the next stage (Feeling). 51% chose feeling whilst 49% chose thinking. Of the seventy four (74) students in Year 2 degree courses, they prefer feeling with 58.1% to thinking with 41.9%. Of the one hundred and seventy one (171) students in the Year 3 degree courses, they prefer feeling with 55% to thinking with 45%. Of the sixty seven (67) students in MBA post graduate course, students preferred thinking with 61.2% while 38.8% chose feeling. Of the thirty three (33) students in MSc post graduate course, 57.6% chose feeling while 42.4% chose thinking.

According to Honey and Mumford's learning styles cycle, students tend to be pragmatist (feeling) over theorist (thinking) on the processing continuum for SL13 as seen in the following graph.

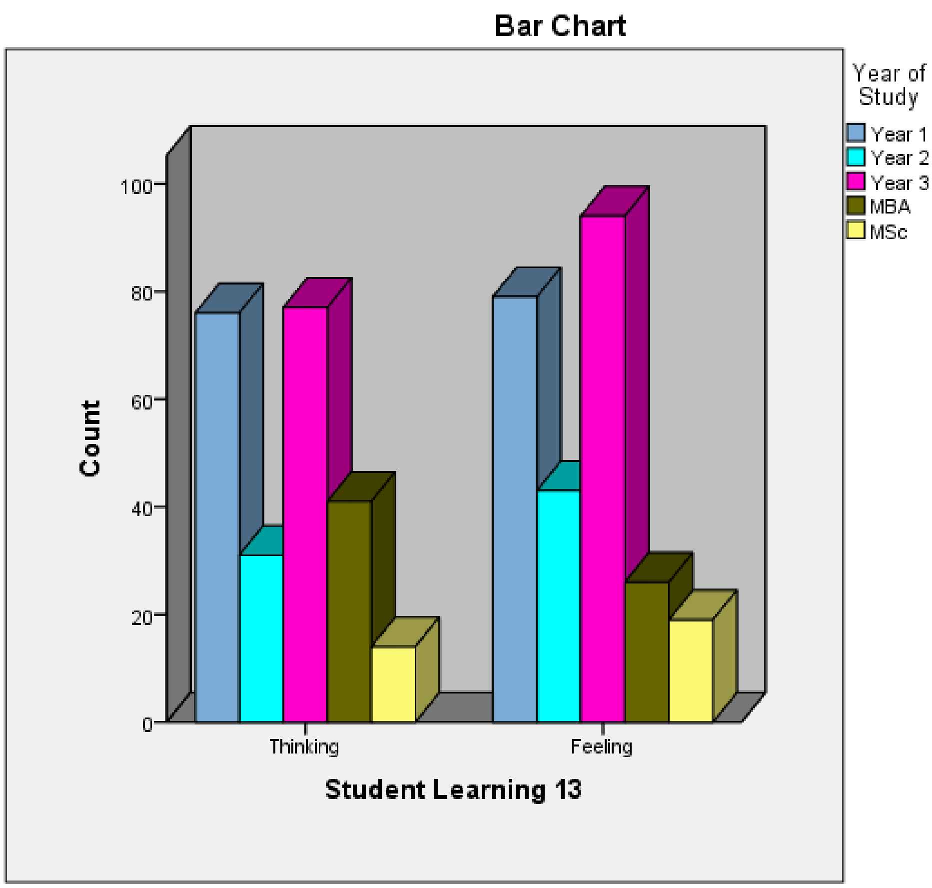


Fig 4.61: Year of Study and SL13

Student Learning 14 (SL14): **Thinking** - I analyze reports to find the basic assumptions and inconsistencies. **Feeling** - I rely upon others to give me the basic gist of reports.

The two variables used for this test were Year of Study and SL14 as stated above.

			Year of Study					Total
			Year 1	Year 2	Year 3	MBA	MSc	
Student Learning 14	**Thinking**	Count	115	58	136	52	26	**387**
		Expected Count	120.0	57.3	132.4	51.9	25.5	**387.0**
	Feeling	Count	40	16	35	15	7	**113**
		Expected Count	35.0	16.7	38.6	15.1	7.5	**113.0**
Total		Count	155	74	171	67	33	**500**
		Expected Count	155.0	74.0	171.0	67.0	33.0	**500.0**

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.434[a]	4	.838
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.46.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.054	.838
	Cramer's V	.054	.838
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.41: Student Learning 14* Year of Study

The results of this cross tabulation gave the following:

$\chi^2(4) = 1.434$, $p = .838$; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Year of Study is not giving any observable difference for SL14.

In the Year of Study, 77.4% of the five hundred students surveyed, overall three hundred and eighty seven (387) students chose Thinking which states *'I analyze reports to find the basic assumptions and inconsistencies'* whilst 22.6% - one hundred and thirteen students (113) chose Feeling which states *'I rely upon others to give me the basic gist of reports'.*

Table 4.41 above illustrates that of the one hundred and fifty five (155) students enrolled in Year 1 (Business Management and Information Technology courses) 74.2% chose thinking whilst 25.8% chose feeling. Of the seventy four (74) students in Year 2 degree courses, they prefer thinking with 78.4% to feeling with 21.6%. Of the one hundred and seventy one (171) students in the Year 3 degree courses, they prefer thinking with 79.5% to feeling with 20.5%. Of the sixty seven (67) students in MBA post graduate course, students preferred thinking with 77.6% and the remaining 22.4% chose feeling. Of the thirty three (33) students in MSc post graduate course, 78.8% chose thinking while 21.2% chose feeling.

According to Honey and Mumford's learning styles cycle, students tend to be theorist (thinking) over pragmatist (feeling) on the processing continuum for SL14 as seen in the following graph. There is a strong indication that students prefer to conclude from an experience (Thinking) as opposed to planning the next stage (Feeling) as illustrated in Fig 4.62.

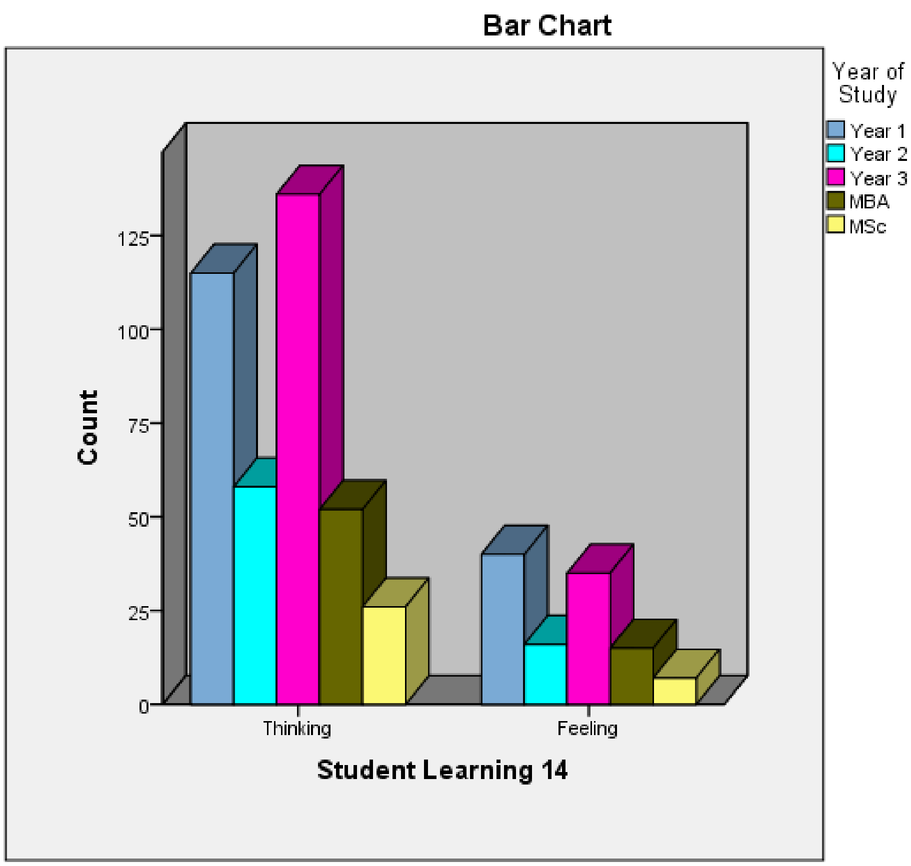


Fig 4.62: Year of Study and SL14

Student Learning 15 (SL15): **Thinking** - I prefer working alone. **Feeling** - I enjoy working with others.

The two variables used for this test were Year of Study and SL15 as stated above.

			Year of Study					Total
			Year 1	Year 2	Year 3	MBA	MSc	
Student Learning 15	Thinking	Count	85	38	109	43	16	**291**
		Expected Count	90.2	43.1	99.5	39.0	19.2	**291.0**
	Feeling	Count	70	36	62	24	17	**209**
		Expected Count	64.8	30.9	71.5	28.0	13.8	**209.0**
Total		Count	155	74	171	67	33	**500**
		Expected Count	155.0	74.0	171.0	67.0	33.0	**500.0**

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.571[a]	4	.160
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 13.79.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.115	.160
	Cramer's V	.115	.160
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.42: Student Learning 15* Year of Study

The results of this cross tabulation gave the following:

$\chi^2(4) = 6.5714$, p =.160; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Year of Study is not giving any observable difference for SL15.

In the Year of Study, 58.5% of the five hundred students surveyed, overall two hundred and ninety one (291) students chose Thinking which states *'I prefer working alone'* whilst 41.8% - two hundred and nine students (209) chose Feeling which states *'I enjoy working with others'*.

Table 4.42 above illustrates that of the one hundred and fifty five (155) students enrolled in Year 1 (Business Management and Information Technology courses) 54.8% chose thinking whilst 45.2% chose feeling. Of the seventy four (74) students in Year 2 degree courses, they prefer thinking with 51.4% to feeling with 48.6%. Of the one hundred and seventy one (171) students in the Year 3 degree courses, they prefer thinking with 63.7% to feeling with 36.3%. Of the sixty seven (67) students in MBA post graduate course, students preferred thinking with 64.2% and the remaining 38.5% chose feeling. Of the thirty three (33) students in MSc post graduate course, 48.5% chose thinking whilst 51.5% chose feeling.

According to Honey and Mumford's learning styles cycle, students tend to be theorist (thinking) over pragmatist (feeling) on the processing continuum for SL15 as seen in the following graph, Fig 4.63. There is a strong indication that students prefer to conclude from an experience (Thinking) as opposed to planning the next stage (Feeling) except for the MSc students where there is no significant margin to indicate that students prefer to plan the next stage (Feeling) as opposed to conclude from an experience (Thinking).

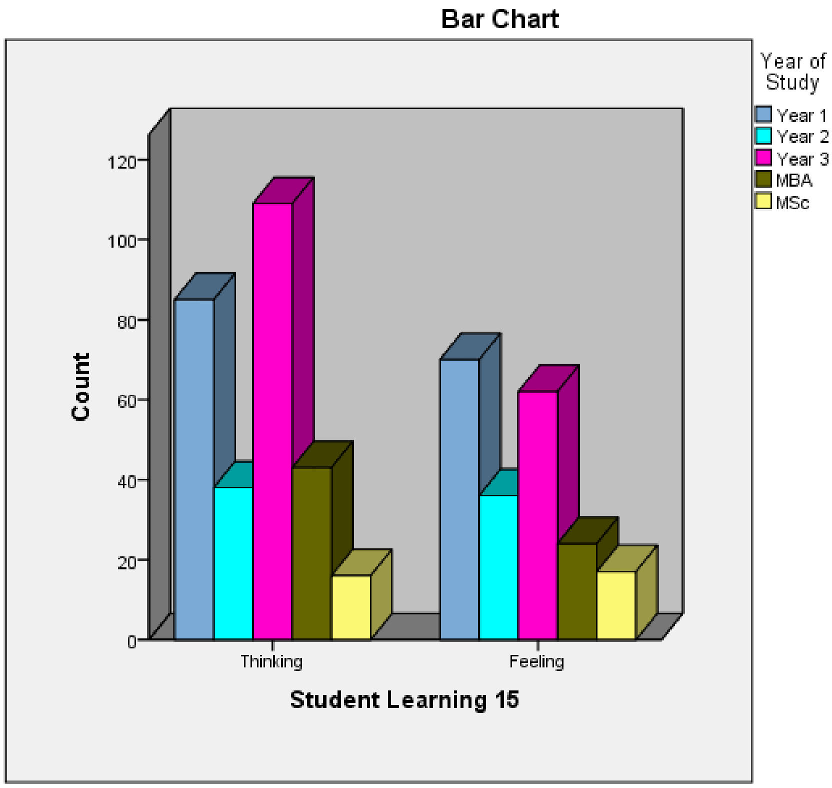


Fig 4.63: Year of Study and SL15

Student Learning 16 (SL16): Thinking - Others would describe me as serious, reserved, and formal. **Feeling** - Others would describe me as verbal, expressive, and informal.

The two variables used for this test were Year of Study and SL16 as stated above.

		Student Learning 16		Total
		Thinking	Feeling	
Year of Study	Year 1	90	65	155
	Year 2	33	41	74
	Year 3	81	90	171
	MBA	39	28	67
	MSc	20	13	33
Total		263	237	500

Table 4.43: Student Learning 16* Year of Study

The results of this cross tabulation gave the following:

$\chi^2(4) = 7.329$, $p = .119$; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Year of Study is not giving any observable difference for SL16.

In the Year of Study, 52.6% of the five hundred students surveyed, overall two hundred and sixty three (263) students chose Thinking which states *'Others would describe me as serious, reserved, and formal'* whilst 47.4% - two hundred and thirty seven students (237) chose Feeling which states *'Others would describe me as verbal, expressive, and informal'.*

The table above illustrates that of the one hundred and fifty five (155) students enrolled in Year 1 (Business Management and Information Technology courses) 58.1% chose thinking whilst 41.9% chose feeling. Of the seventy four (74) students in Year 2 degree courses, they chose thinking with 44.6% and 55.4%.chose feeling. Of the one hundred and seventy one (171) students in the Year 3 degree courses, they chose thinking with 47.4% whilst 52.6% chose feeling. Of the sixty seven (67) students in MBA post graduate course, students preferred thinking with 58.2% and the remaining 41.8% chose feeling. Of the thirty three (33) students in MSc post graduate course, 60.6% chose thinking whilst 39.4% chose feeling.

According to Honey and Mumford's learning styles cycle, students in year 1, MBA and MSc tend to conclude from an experience , that is , be theorist (thinking) whilst students in years 2 and 3 tend to prefer to plan the next stage ,that is, be a pragmatist (feeling) on the processing continuum for SL16 as seen in the following graph.

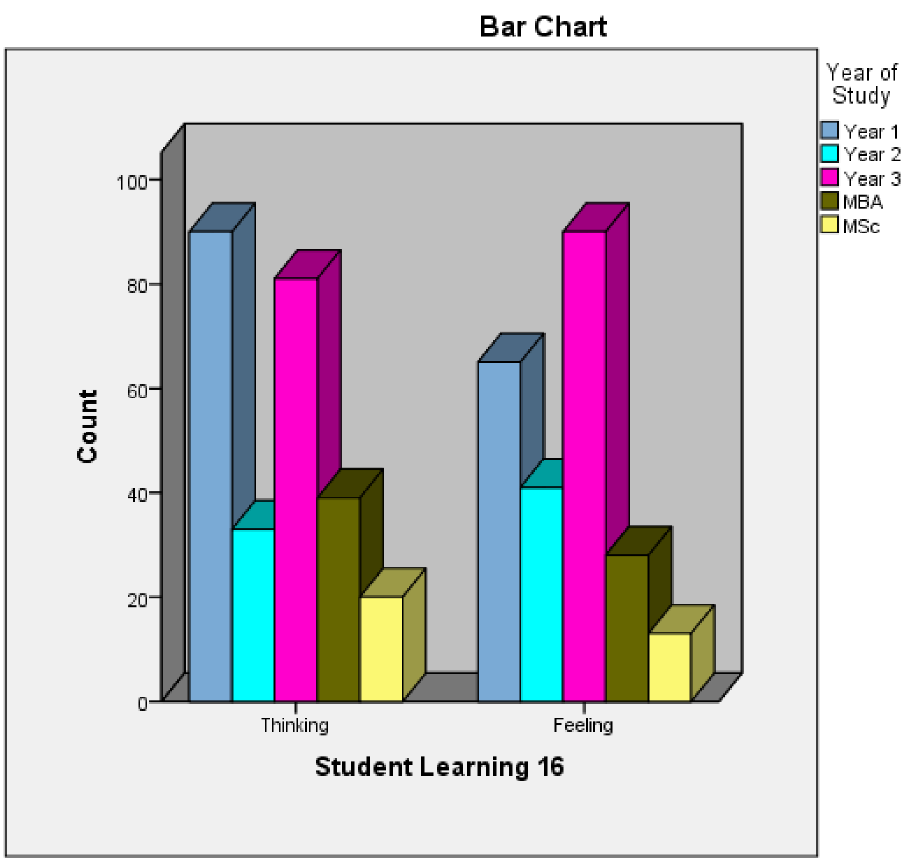


Fig 4.64: Year of Study and SL16

Student Learning 17 (SL17): Thinking - I use facts to make decisions. **Feeling** - I use feelings to make decisions.

The two variables used for this test were Year of Study and SL17 as stated above.

			Year of Study					Total
			Year 1	Year 2	Year 3	MBA	MSc	
Student Learning 17	**Thinking**	Count	118	52	133	56	26	**385**
		Expected Count	119.4	57.0	131.7	51.6	25.4	**385.0**
	Feeling	Count	37	22	38	11	7	**115**
		Expected Count	35.7	17.0	39.3	15.4	7.6	**115.0**
Total		Count	155	74	171	67	33	**500**
		Expected Count	155.0	74.0	171.0	67.0	33.0	**500.0**

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.716[a]	4	.446
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.59.

Table 4.44: Student Learning 17* Year of Study

The results of this cross tabulation gave the following:

$\chi^2(4) = 3.716$, $p = .446$; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Year of Study is not giving any observable difference for SL17.

In the Year of Study, 77% of the five hundred students surveyed, an overall three hundred and eighty five (385) students chose Thinking which states *'I use facts to make decisions'* whilst 22.6% - one hundred and fifteen students (115) chose Feeling which states *'I use feelings to make decisions'.*

The table above, Table 4.44, illustrates that of the one hundred and fifty five (155) students enrolled in Year 1 (Business Management and Information Technology courses) 76.1% chose thinking whilst 23.9% chose feeling. Of the seventy four (74) students in Year 2 degree courses, 70.3% prefer thinking to 29.7% who chose feeling. Of the one hundred and seventy one (171) students in the Year 3 degree courses, 77.8% prefer thinking to 22.2% who chose feeling. Of the sixty seven (67) students in MBA post graduate course, 83.6% of the students preferred thinking and the remaining 16.4% chose feeling. Of the thirty three (33) students in MSc post graduate course, 78.8% chose thinking while 21.2% chose feeling.

According to Honey and Mumford's learning styles cycle, students tend to be theorist (thinking) over pragmatist (feeling) on the processing continuum for SL17 as seen in the following graph, Fig 4.65. There is a strong indication that students prefer to conclude from an experience (Thinking) as opposed to planning the next stage (Feeling).

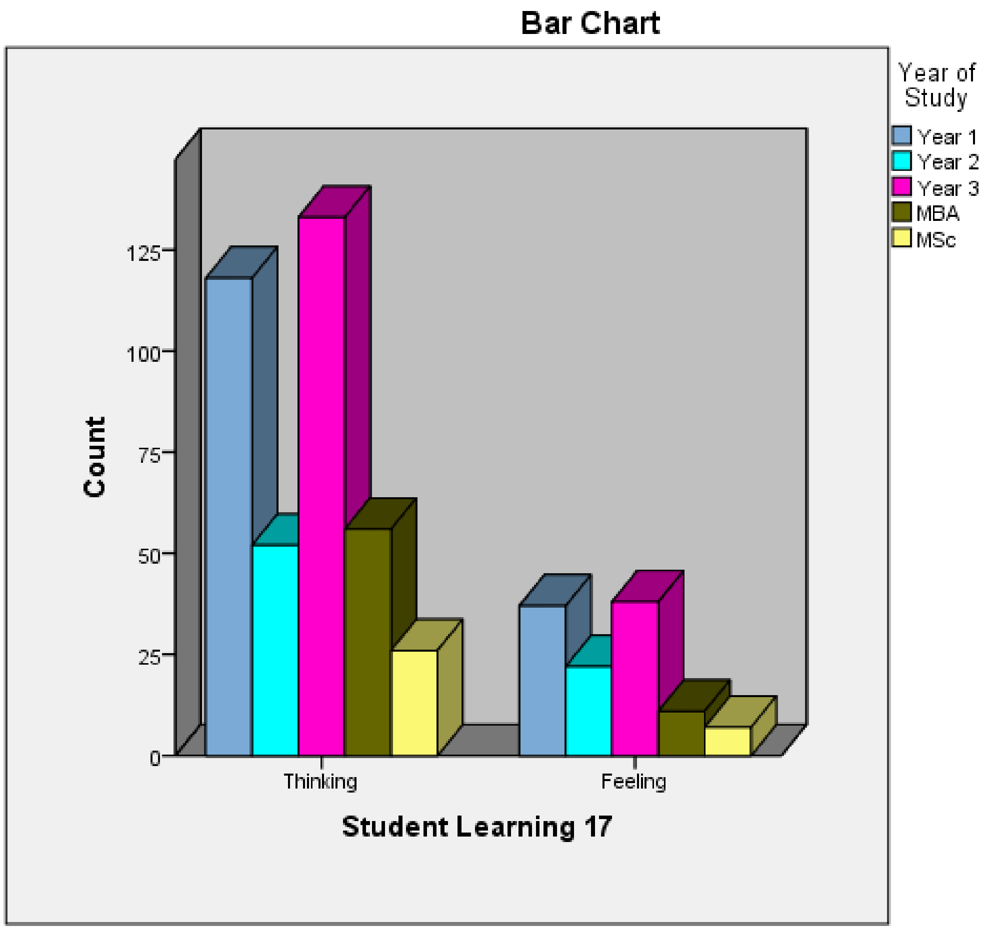


Fig 4.65: Year of Study and SL17

Student Learning 18 (SL18): **Thinking** - I am difficult to get to know. **Feeling** - I am easy to get to know.

The two variables used for this test were Year of Study and SL18 as stated above.

			Year of Study					Total
			Year 1	Year 2	Year 3	MBA	MSc	
Student Learning 18	**Thinking**	Count	48	21	53	26	9	**157**
		Expected Count	48.7	23.2	53.7	21.0	10.4	**157.0**
	Feeling	Count	107	53	118	41	24	**343**
		Expected Count	106.3	50.8	117.3	46.0	22.6	**343.0**
Total		Count	155	74	171	67	33	**500**
		Expected Count	155.0	74.0	171.0	67.0	33.0	**500.0**

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.307[a]	4	.679
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 10.36.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.068	.679
	Cramer's V	.068	.679
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.45: Student Learning 18* Year of Study

The results of this cross tabulation gave the following:

$\chi^2(4) = 2.307$, $p = .679$; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Year of Study is not giving any observable difference for SL18.

In the Year of Study, 31.4% of the five hundred students surveyed, an overall one hundred and fifty seven (157) students chose Thinking which states *'I am difficult to get to know'* whilst 68.6% - three hundred and forty three students (343) chose Feeling which states *'I am easy to get to know'.*

Table 4.45 above illustrates that of the one hundred and fifty five (155) students enrolled in Year 1 (Business Management and Information Technology courses) 31% chose thinking whilst 69% chose feeling. Of the seventy four (74) students in Year 2 degree courses, 28.4% chose thinking to 71.6% who chose feeling. Of the one hundred and seventy one (171) students in the Year 3 degree courses, 31% prefer thinking to 69% who chose feeling. Of the sixty seven (67) students in MBA post graduate course, 38.8% of the students chose thinking and the remaining 61.2% preferred feeling. Of the thirty three (33) students in MSc post graduate course, 27.3% chose thinking while the remaining 68.6% chose feeling.

According to Honey and Mumford's learning styles cycle, students tend to be pragmatist (feeling) over theorist (thinking) on the processing continuum for SL18 as seen in the following graph, Fig 4.66. There is a strong indication that students prefer to plan the next stage (Feeling) as opposed to conclude from an experience (Thinking)

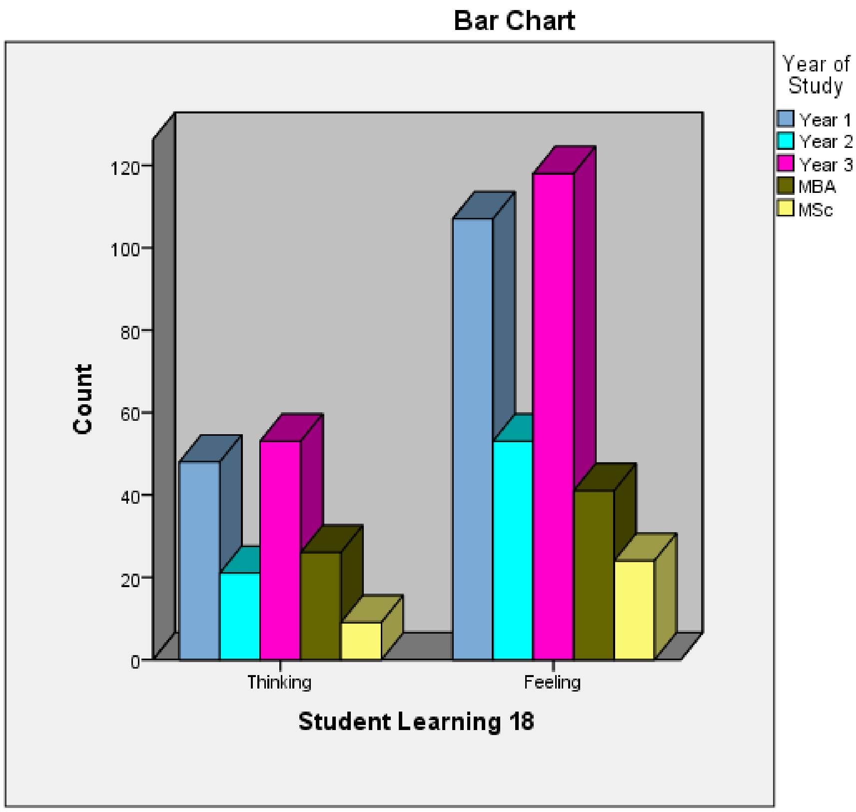


Fig 4.66: Year of Study and SL18

The two variables used in this test were Option of Study and Student Learning10

SL10: Thinking - I ask probing questions when learning a new subject. **Feeling** - I am good at picking up hints and techniques from other people.

			Option of Study			Total
			Full Time	**Part Time**	**Saturday**	
Student Learning 10	**Thinking**	Count	40	48	141	229
		% within Option of Study	44.0%	51.6%	44.6%	45.8%
	Feeling	Count	51	45	175	271
		% within Option of Study	56.0%	48.4%	55.4%	54.2%
Total		Count	91	93	316	500
		% within Option of Study	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table 4.46 Student Learning 10 * Option of Study

The results of this cross tabulation gave the following:

χ^2 (2) = 1.588.p =.0457; H_0 = accepted

There was no observable difference in responses therefore H_0 has been accepted. This indicates that the Option of Study is not giving any observable difference for SL10.

In the survey of the five hundred students surveyed, overall two hundred and twenty nine (229) students, which accounted for 45.8%, chose **Thinking** which states ***'****I ask probing questions when learning a new subject'* whilst 54.2% (two hundred and seventy one (271) students chose **Feeling** which states *'I am good at picking up hints and techniques from other people'*, at the present time of their study.

The table above shows that of the ninety one (91) students enrolled as Full Time students prefer Feeling with 56% to Thinking with 44%. Of the ninety three (93) students enrolled in the degree courses as Part time option, they chose Thinking at 51.6% and

Feeling with 48.4%. Of the three hundred and sixteen (316) students enrolled as Saturday option, they prefer Feeling with 55.4% to Thinking with 44.6%. According to Honey and Mumford's learning styles cycle, students tend to be pragmatist (feeling) over theorist (thinking) on the processing continuum for SL18 as seen in the following graph, Fig 4.67. There is a strong indication that students prefer to plan the next stage (Feeling) as opposed to conclude from an experience (Thinking)

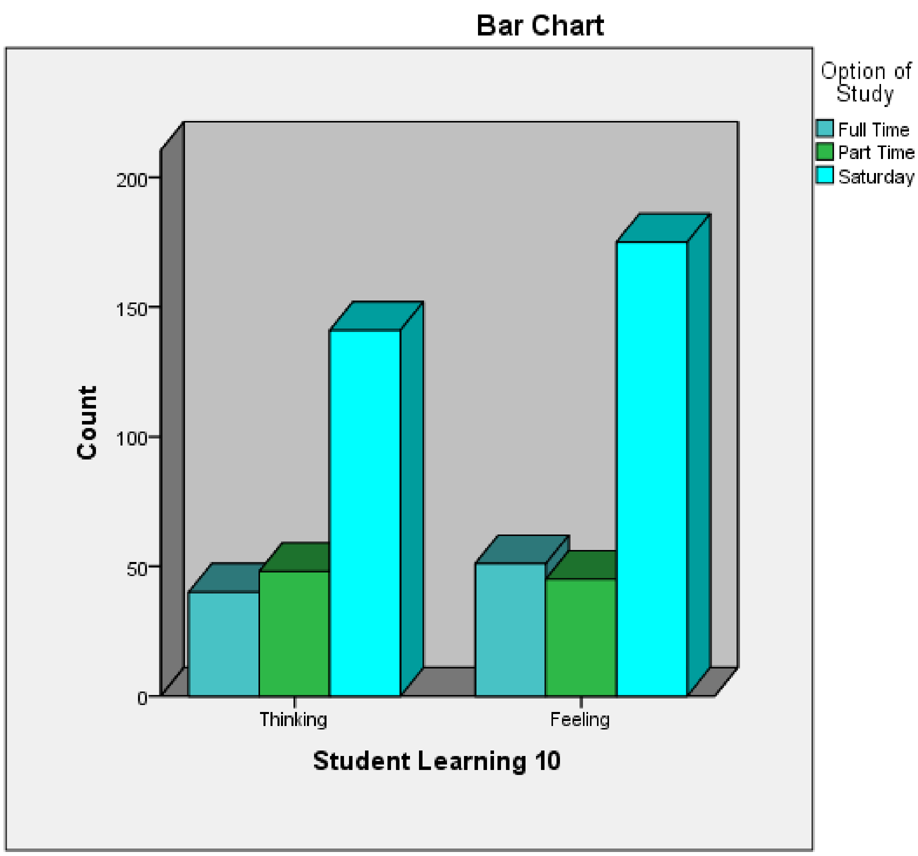


Fig 4.67 Student Learning 10 * Option of Study

The two variables used in this test were Option of Study and Student Learning11

SL11: Thinking - I am rational and logical. **Feeling** - I am practical and down to earth.

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 11	Thinking	Count	44	36	113	193
		% within Option of Study	48.4%	38.7%	35.8%	38.6%
	Feeling	Count	47	57	203	307
		% within Option of Study	51.6%	61.3%	64.2%	61.4%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%

Table 4.46 Student Learning 10 * Option of Study

The results of this cross tabulation gave the following:

χ^2 (2) = 4.728 .p =.094; H_0 = accepted

There was no observable difference in responses therefore H_0 has been accepted. This indicates that the Option of Study is not giving any observable difference for SL11.

In the survey conducted 38.6% of students chose **Thinking** - *I am rational and logical* whilst 61.4% chose **Feeling** - *I am practical and down to earth*, at the present time of their study

Table 4.46 shows that of the ninety one (91) students enrolled as Full Time students prefer Feeling with 51.6% to Thinking with 48.4%. Of the ninety three (93) students enrolled in the degree courses as Part time option, they chose Feeling at 61.3% and Thinking with 38.7%. Of the three hundred and sixteen (316) students enrolled as Saturday option, they prefer Feeling with 64.2% to Thinking with 35.8%. According to Honey and Mumford's learning styles cycle, students tend to be pragmatist (feeling) over theorist (thinking) on the processing continuum for SL11 as seen in the following graph. There is a strong indication that students attending classes Part time and Saturday prefer to plan the next stage (Feeling) as opposed to conclude from an experience (Thinking). Students attending Full time classes there is no significant margin to indicate that students prefer to planning the next stage (Feeling) as opposed to conclude from an experience (Thinking)

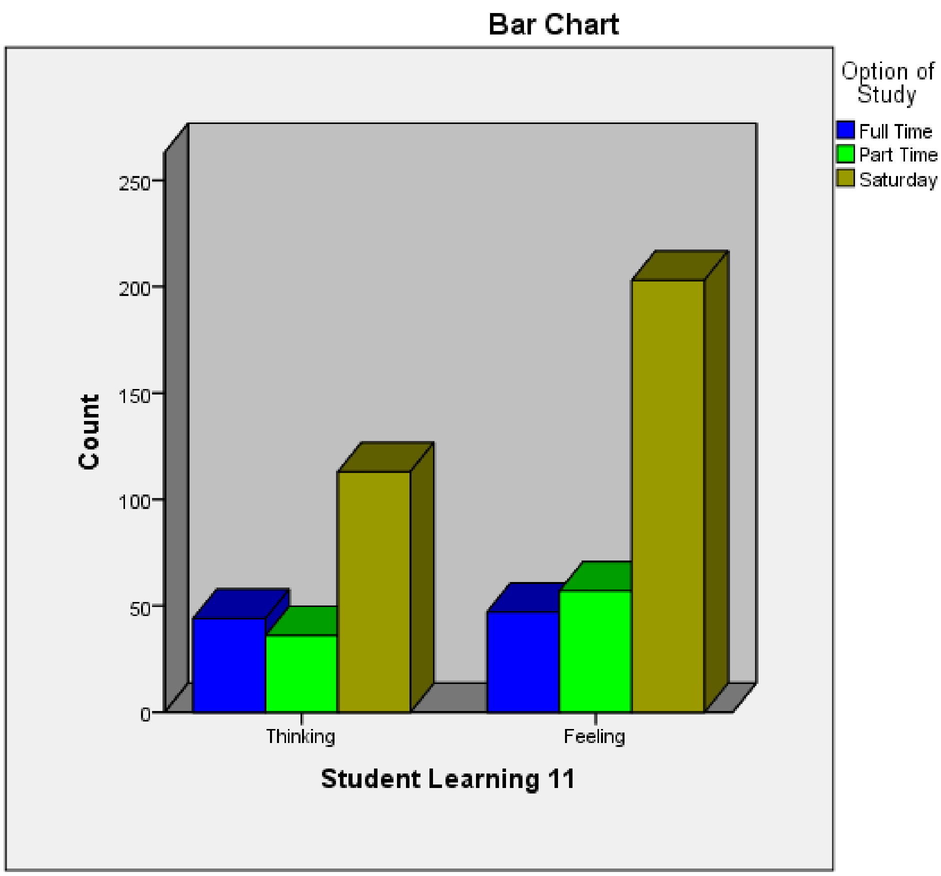


Fig 4.68 Student Learning 11 * Option of Study

The two variables used in this test were Option of Study and Student Learning12

SL12: Thinking - I plan events down to the last detail. **Feeling** - I like realistic, but flexible plans.

			Option of Study			Total
			Full Time	**Part Time**	**Saturday**	
Student Learning 12	**Thinking**	Count	18	31	106	155
		% within Option of Study	19.8%	33.3%	33.5%	31.0%
	Feeling	Count	73	62	210	345
		% within Option of Study	80.2%	66.7%	66.5%	69.0%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.549[a]	2	.038
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 28.21.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.114	.038
	Cramer's V	.114	.038
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.48 Student Learning 11 * Option of Study

The results of this cross tabulation gave the following:

χ^2 (2) = 6.549, p =.038; H_0 = rejected

There was an observable difference in responses therefore the null hypothesis, H_0, has been rejected. This indicates that the Option of Study is giving an observable difference for SL12.

In the survey conducted 31% of students chose **Thinking** - I *plan events down to the last detail* whilst 69% preferred **Feeling** - *I like realistic, but flexible plans*, at the present time of their study.

Table 4.48 shows that of the ninety one (91) students enrolled as Full Time students prefer Feeling with 80.2% to Thinking with 19.8%. Of the ninety three (93) students enrolled in the degree courses as Part time option, they chose Feeling at 66.7% and Thinking with 33.3%. Of the three hundred and sixteen (316) students enrolled as Saturday option, they prefer Feeling with 66.5% to Thinking with 33.5%. According to Honey and Mumford's learning styles cycle, students tend to be pragmatist (feeling) over theorist (thinking) on the processing continuum for SL12 as seen in the following graph. There is a strong indication that students prefer to be realistic, but yet have flexible plans as opposed to plan events down to the last detail.

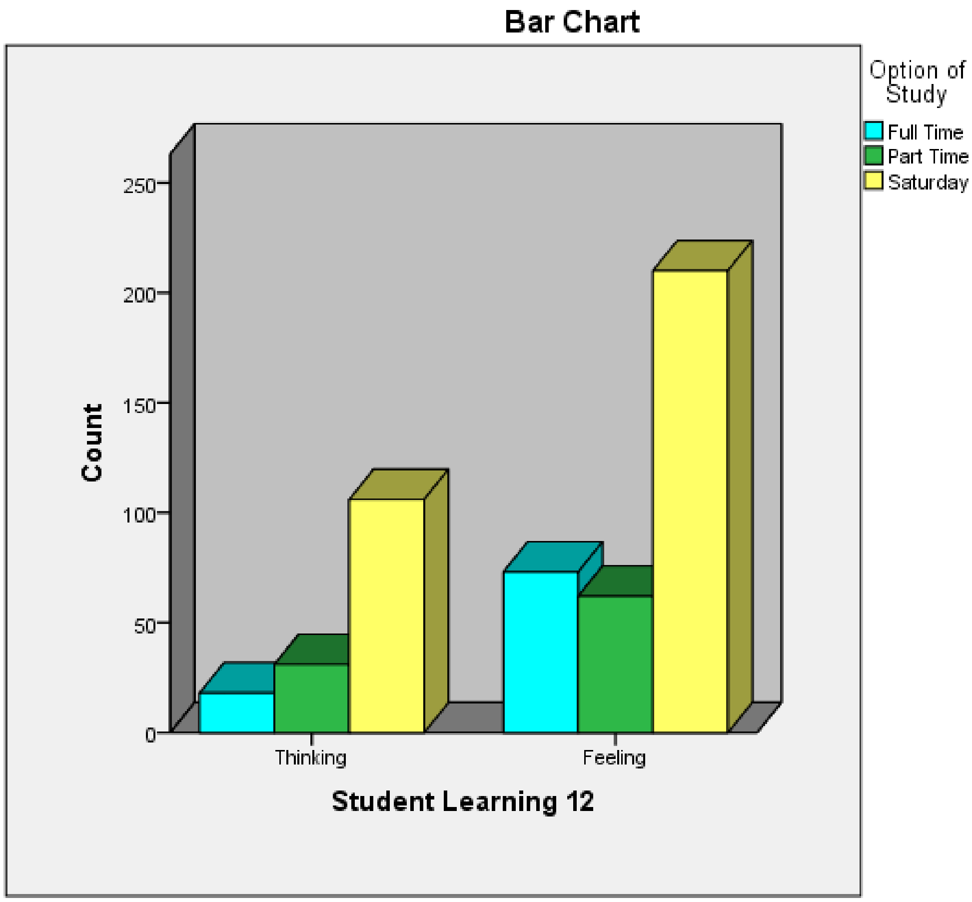


Fig 4.69 Student Learning 12 * Option of Study

The two variables used in this test were Option of Study and Student Learning13

SL13: Thinking - I like to know the right answers before trying something new.

Feeling - I try things out by practicing to see if they work.

The results of this cross tabulation gave the following:

χ^2 (2) = 4.865.p =.088; H_0 = accepted

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 13	Thinking	Count	34	47	158	239
		Expected Count	43.5	44.5	151.0	239.0
		% within Option of Study	37.4%	50.5%	50.0%	47.8%
	Feeling	Count	57	46	158	261
		Expected Count	47.5	48.5	165.0	261.0
		% within Option of Study	62.6%	49.5%	50.0%	52.2%
Total		Count	91	93	316	500
		Expected Count	91.0	93.0	316.0	500.0
		% within Option of Study	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.865[a]	2	.088
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 43.50.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.099	.088
	Cramer's V	.099	.088
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.49 Student Learning 13 * Option of Study

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Option of Study is not giving any observable difference for SL13.

In the survey conducted 47.8% of students chose **Thinking** - *I like to know the right answers before trying something new* whilst 52.2% chose **Feeling** - *I try things out by practicing to see if they work*, at the present time of their study

In Table 4.49 above shows that of the ninety one (91) students enrolled as Full Time students prefer Feeling with 62.6% to Thinking with 37.4%. Of the ninety three (93) students enrolled in the degree courses as Part time option, there was a statistical tie between Feeling with 50.5% and Thinking with 49.5%. Of the three hundred and sixteen (316) students enrolled as Saturday option, again there was a tie with Feeling with 50% and Thinking with 50%.

According to Honey and Mumford's learning styles cycle, students attending Full time classes, they tend to be pragmatist (feeling) over theorist (thinking) on the processing continuum. Students attending Part time as well as Saturday there is no significant margin to indicate that students prefer to plan the next stage (Feeling) as opposed to conclude from an experience (Thinking) as shown in the graph below.

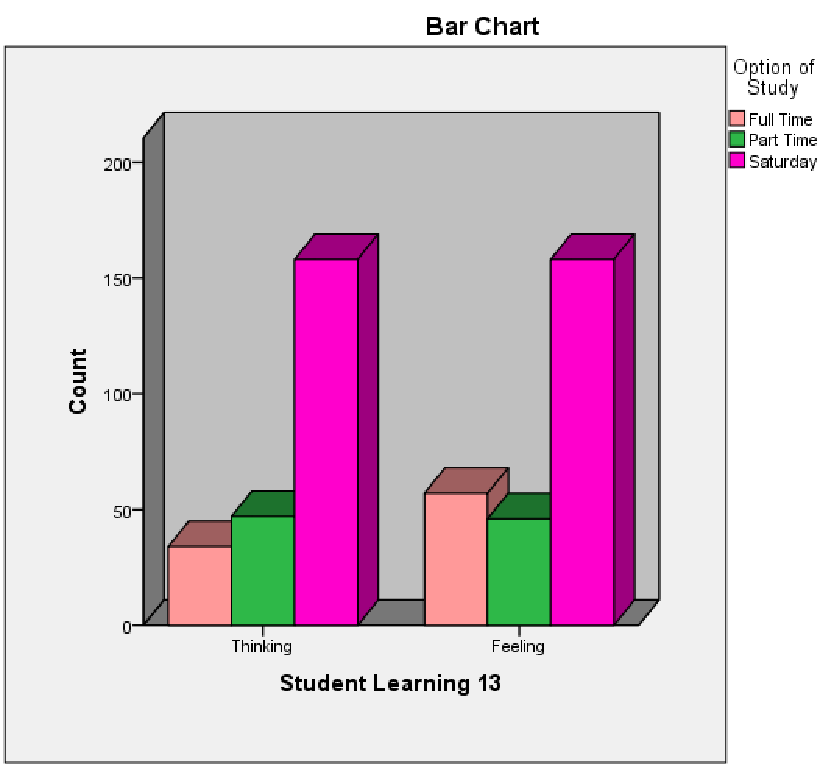


Fig 4.70 Student Learning 13 * Option of Study

The two variables used in this test were Option of Study and Student Learning14

SL14: Thinking - I analyze reports to find the basic assumptions and inconsistencies. **Feeling** - I rely upon others to give me the basic gist of reports.

			Option of Study			Total
			Full Time	**Part Time**	**Saturday**	
Student Learning 14	**Thinking**	Count	67	71	249	387
		% within Option of Study	73.6%	76.3%	78.8%	77.4%
	Feeling	Count	24	22	67	113
		% within Option of Study	26.4%	23.7%	21.2%	22.6%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%

Table 4.50 Student Learning 13 * Option of Study

The results of this cross tabulation gave the following:

χ^2 (2) = 1.153. p =.562; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Option of Study is not giving any observable difference for SL14.

In the survey conducted 77.4% of students preferred **Thinking** - *I analyze reports to find the basic assumptions and inconsistencies* whilst 22.6% chose **Feeling** - *I rely upon others to give me the basic gist of reports,* at the present time of their study.

Table 4.50 shows that of the ninety one (91) students enrolled as Full Time students prefer Thinking with 73.6% to Feeling with 26.4%. Of the ninety three (93) students enrolled in the degree courses as Part time option, students prefer Thinking with 76.3% and Feeling with 23.7%. Of the three hundred and sixteen (316) students enrolled as Saturday option, students prefer Thinking with 78.8% and Feeling with 21.2%.

According to Honey and Mumford's learning styles cycle, students tend to be theorist (thinking) over pragmatist (feeling) over on the processing continuum as illustrated in the graph below. There is a strong indication that students prefer to analyze reports to find the basic assumptions and inconsistencies, rather than rely upon others to give me the basic gist of reports.

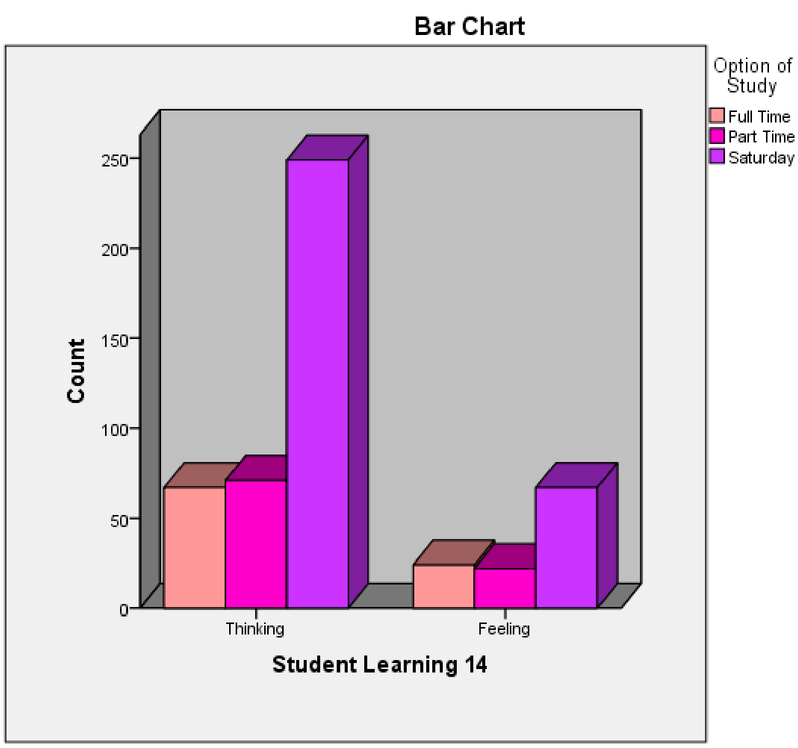


Fig 4.71 Student Learning 14 * Option of Study

The two variables used in this test were Option of Study and Student Learning15

SL15: Thinking - I prefer working alone. **Feeling** - I enjoy working with others.

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 15	Thinking	Count	53	53	185	291
		Expected Count	53.0	54.1	183.9	291.0
		% within Option of Study	58.2%	57.0%	58.5%	58.2%
	Feeling	Count	38	40	131	209
		Expected Count	38.0	38.9	132.1	209.0
		% within Option of Study	41.8%	43.0%	41.5%	41.8%
Total		Count	91	93	316	500
		Expected Count	91.0	93.0	316.0	500.0
		% within Option of Study	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.072[a]	2	.965
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 38.04.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.012	.965
	Cramer's V	.012	.965
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.51 Student Learning 15 * Option of Study

The results of this cross tabulation gave the following:

χ^2 (2) = 0.072.p =.962; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Option of Study is not giving any observable difference for SL15

In the survey conducted 58.2% of students chose **Thinking** - *I prefer working alone* whilst 41.8% chose **Feeling** - *I enjoy working with others*, at the present time of their study.

Table 4.51 shows that of the ninety one (91) students enrolled as Full Time students prefer Thinking with 58.2% to Feeling with 41.8%. Of the ninety three (93) students enrolled in the degree courses as Part time option, students prefer Thinking with 57% and Feeling with 43%. Of the three hundred and sixteen (316) students enrolled as Saturday option, students prefer Thinking with 58.5% and Feeling with 41.5%.

According to Honey and Mumford's learning styles cycle, students tend to be theorist (thinking) over pragmatist (feeling) over on the processing continuum as illustrated in the graph below. There is a strong indication that students prefer to prefer working alone, rather than enjoying working with others.

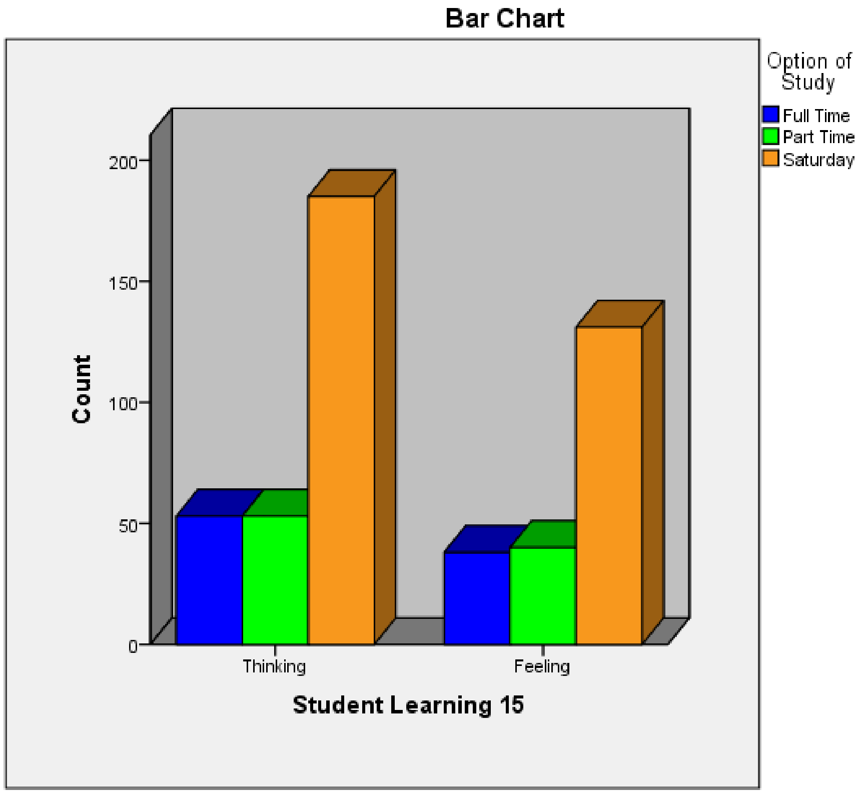


Fig 4.72 Student Learning 15 * Option of Study

The two variables used in this test were Option of Study and Student Learning16

SL16: Thinking - Others would describe me as serious, reserved, and formal.

Feeling - Others would describe me as verbal, expressive, and informal.

The results of this cross tabulation gave the following:

χ^2 (2) = 4.605.p =.0117; H_0 = accepted

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 16	Thinking	Count	39	50	174	263
		% within Option of Study	42.9%	53.8%	55.1%	52.6%
	Feeling	Count	52	43	142	237
		% within Option of Study	57.1%	46.2%	44.9%	47.4%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%

Table 4.52 Student Learning 16 * Option of Study

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Option of Study is not giving any observable difference for SL16.

In the survey conducted 52.6% of students chose **Thinking** - Others *would describe me as serious, reserved, and formal* whilst 47.4% chose **Feeling** - *Others would describe me as verbal, expressive, and informal*, at the present time of their study

Table 4.52 shows that of the ninety one (91) students enrolled as Full Time students chose Thinking with 42.9% and Feeling with 57.1%. Of the ninety three (93) students enrolled in the degree courses as Part time option, students chose Thinking with 53.8% and Feeling with 46.2%. Of the three hundred and sixteen (316) students enrolled as Saturday option, students prefer Thinking with 55.1% and Feeling with 44.9%.

According to Honey and Mumford's learning styles cycle, part time and Saturday students tend to be theorist (thinking) where others *would describe them as serious,* *reserved, and formal* while the fulltime students preferred pragmatist where *others would describe them as verbal, expressive, and informal*, as illustrated in the graph below.

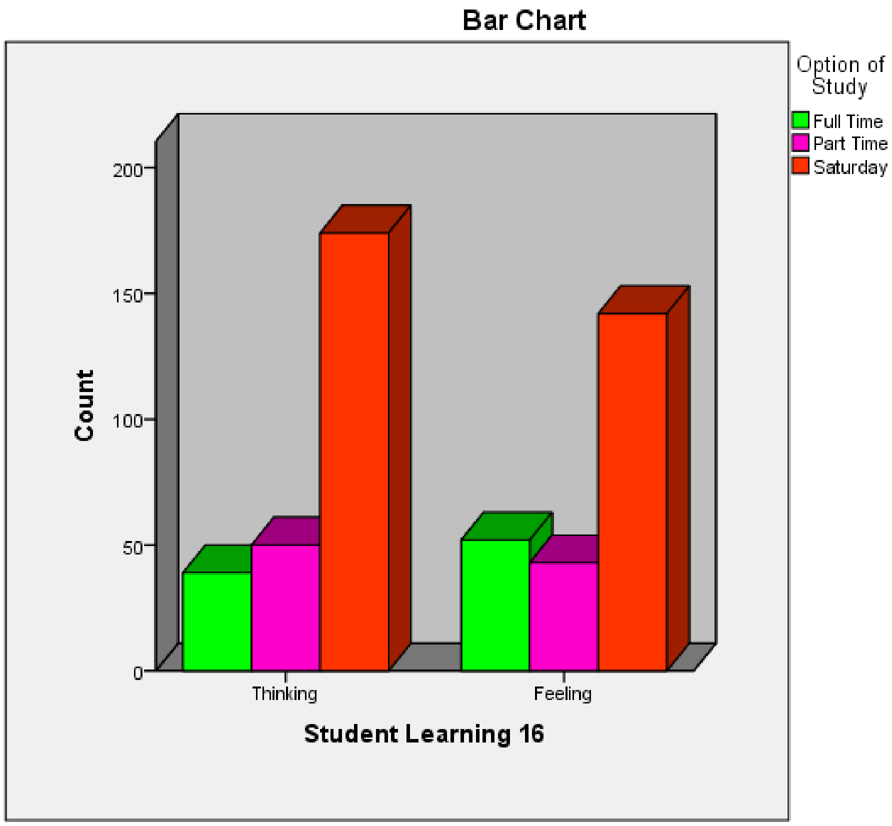


Fig 4.73 Student Learning 16 * Option of Study

The two variables used in this test were Option of Study and Student Learning17

SL17: Thinking - I use facts to make decisions. **Feeling** - I use feelings to make decisions.

The results of this cross tabulation gave the following:

χ^2 (2) = 2.173.p =0.337; H_0 = accepted

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 17	Thinking	Count	67	68	250	385
		Expected Count	70.1	71.6	243.3	385.0
		% within Option of Study	73.6%	73.1%	79.1%	77.0%
	Feeling	Count	24	25	66	115
		Expected Count	20.9	21.4	72.7	115.0
		% within Option of Study	26.4%	26.9%	20.9%	23.0%
Total		Count	91	93	316	500
		Expected Count	91.0	93.0	316.0	500.0
		% within Option of Study	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.173[a]	2	.337
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 20.93.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.066	.337
	Cramer's V	.066	.337
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.53 Student Learning 17 * Option of Study

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Option of Study is not giving any observable difference for SL17.

In the survey conducted 77% of students chose **Thinking** - *I use facts to make decisions* whilst 23% chose **Feeling** - *I use feelings to make decisions*, at the present time of their study.

The table above shows that of the ninety one (91) students enrolled as Full Time students chose Thinking with 73.6% and Feeling with 26.4%. Of the ninety three (93) students enrolled in the degree courses as Part time option, students chose Thinking with 73.1% and Feeling with 26.9%. Of the three hundred and sixteen (316) students enrolled as Saturday option, students prefer Thinking with 79.1% and Feeling with 20.9%.

According to Honey and Mumford's learning styles cycle, students tend to be theorist (thinking) whereby they *use facts to make decisions* instead of *using feelings to make decisions* as illustrated in the graph below.

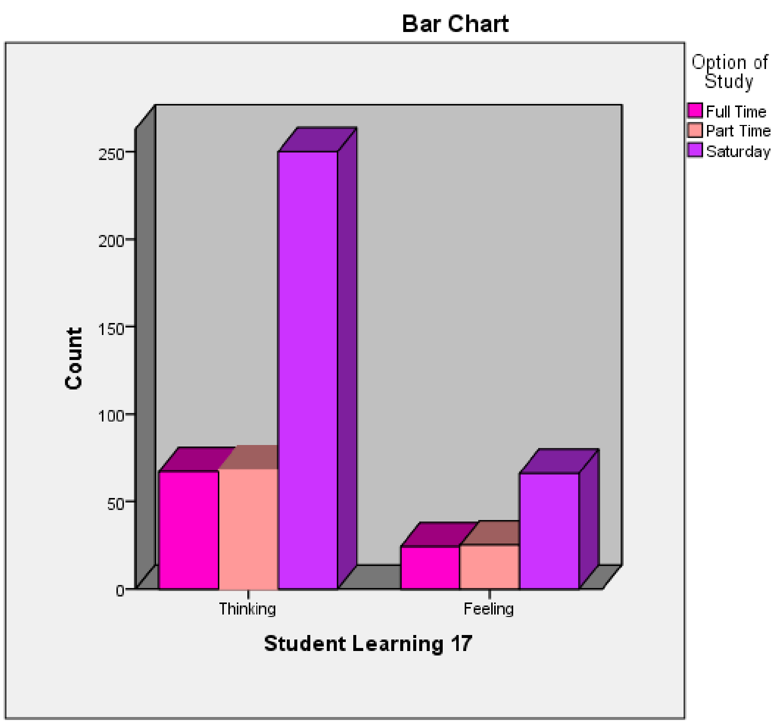


Fig 4.74 Student Learning 17 * Option of Study

The two variables used in this test were Option of Study and Student Learning18

SL18: Thinking - I am difficult to get to know. **Feeling** - I am easy to get to know.

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 18	Thinking	Count	28	23	106	157
		Expected Count	28.6	29.2	99.2	157.0
		% within Option of Study	30.8%	24.7%	33.5%	31.4%
	Feeling	Count	63	70	210	343
		Expected Count	62.4	63.8	216.8	343.0
		% within Option of Study	69.2%	75.3%	66.5%	68.6%
Total		Count	91	93	316	500
		Expected Count	91.0	93.0	316.0	500.0
		% within Option of Study	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.611[a]	2	.271
N of Valid Cases	500		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 28.57.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.072	.271
	Cramer's V	.072	.271
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 4.54 Student Learning 18 * Option of Study

The results of this cross tabulation gave the following:

χ^2 (2) = 2.611.p =0.271; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Option of Study is not giving any observable difference for SL18.

In the survey conducted 31.4% of students chose **Thinking** - I am difficult to get to know whilst 68.6% preferred **Feeling** - *I am easy to get to know*, at the present time of their study.

The table 4.54 above shows that of the ninety one (91) students enrolled as Full Time students chose Thinking with 30.8% and Feeling with 69.2%. Of the ninety three (93) students enrolled in the degree courses as Part time option, students chose Thinking with 24.7% and Feeling with 75.3%. Of the three hundred and sixteen (316) students enrolled as Saturday option, students chose Thinking with 33.5% and Feeling with 66.5%.

According to Honey and Mumford's learning styles cycle, students tend to be pragmatist (feeling) whereby they *are easy to get to know* instead of being difficult to get to know as illustrated in the graph below.

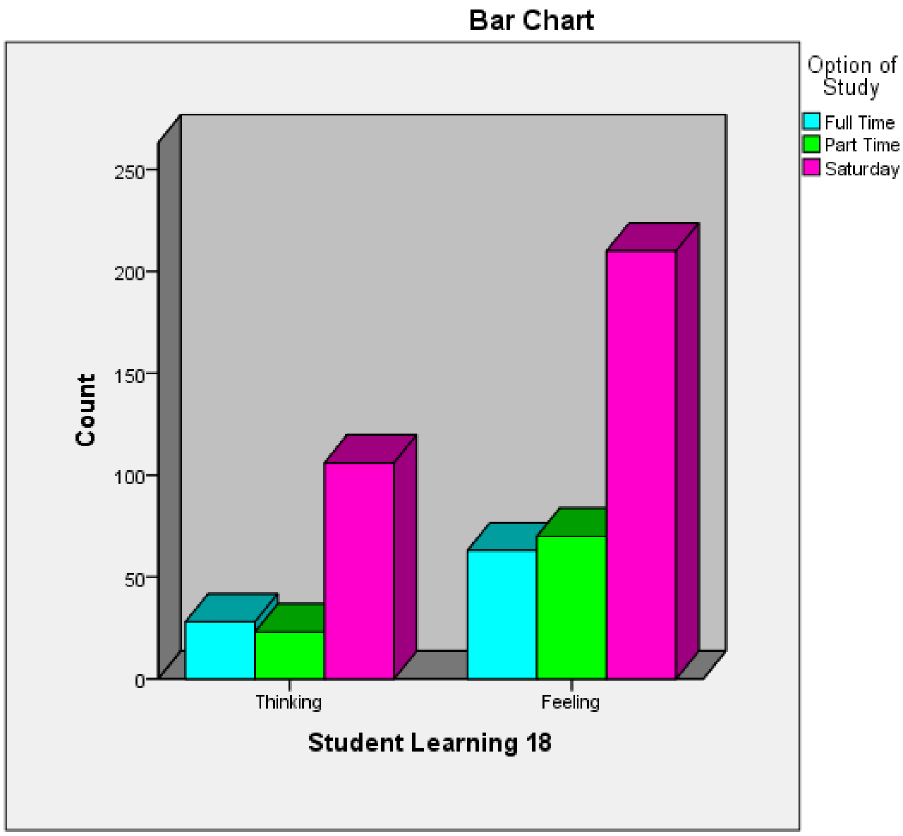


Fig 4.75 Student Learning 18 * Option of Study

The two variables used in this test were Age Group and Student Learning 10:

SL10: Thinking - I ask probing questions when learning a new subject. **Feeling** - I am good at picking up hints and techniques from other people.

The results of this cross tabulation gave the following:

χ^2 (6) = 6.034, p =0.419; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Age Group is not giving any observable difference for SL10.

In the survey conducted 45.8% of students chose **thinking** (*I ask probing questions when learning a new subject)* whilst 54.2% chose **feeling** (*I am good at picking up hints and techniques from other people*.) at the present time of their study.

Of the ninety two (92) students in the seventeen to twenty one age group chose Thinking with 37% and 63% chose Feeling. Of the one hundred and twenty eight (128) students in the age group twenty two and twenty six years, 43.8% chose Thinking while 56.2% chose Feeling. Of the one hundred and two (102) students within the twenty seven to thirty one age group, 46.1% chose Thinking whilst 53.9% chose Feeling. In the age group of thirty two to thirty six, of the ninety three (93) students surveyed 52.7% chose Thinking while 47.3% chose Feeling. The thirty (30) students in the age group thirty seven to forty one 46.7% chose Thinking and 53.3% chose Feeling. Of the thirty five (35) students in the forty two to forty six years category, 51.4% preferred chose

Thinking and 48.6% chose Feeling and the twenty (20) students who fell within the greater than forty seventy years category, 55% chose Thinking and 45% chose Feeling. According to Honey and Mumford's learning styles cycle, students tend to be pragmatist (feeling) whereby they are good at picking up hints and techniques from other people instead of *asking* probing questions when learning a new subject as illustrated in the graph below.

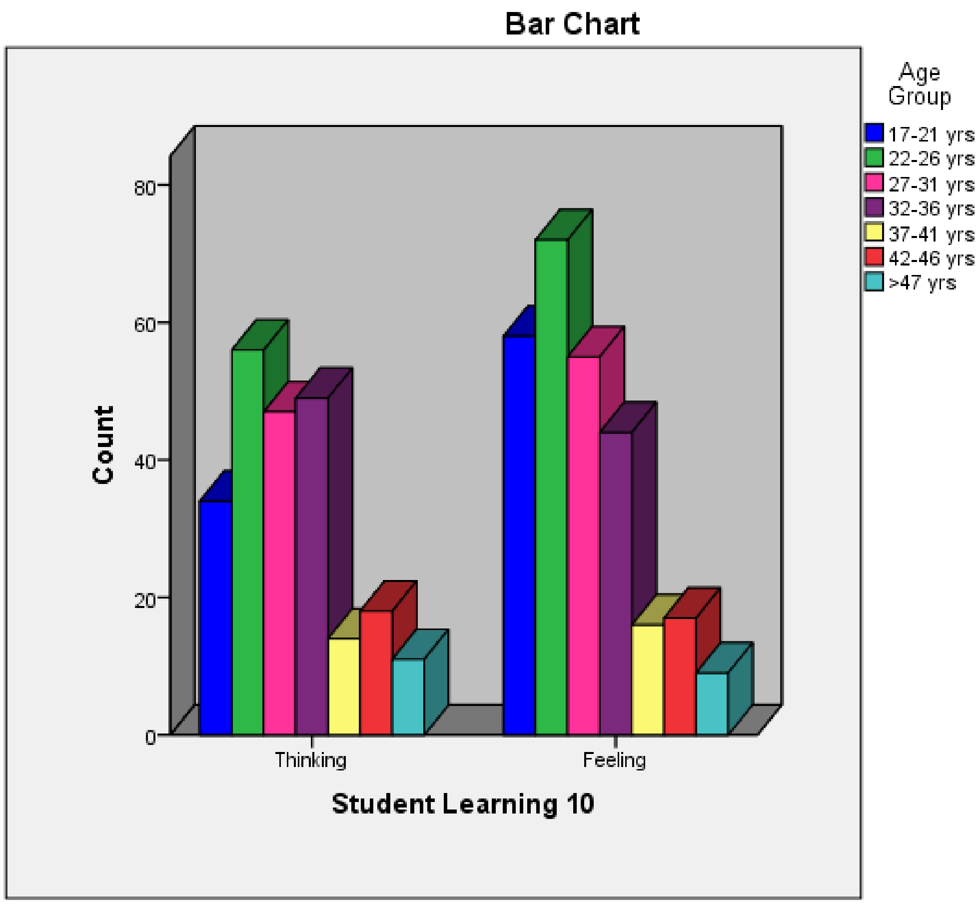


Fig 4.76: Age Group * Student Learning 10

The two variables used in this test were Age Group and Student Learning 11:

SL11: Thinking - I am rational and logical. **Feeling** - I am practical and down to earth.

The results of this cross tabulation gave the following:

χ^2 (6) = 4.544, p =0.604; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Age Group is not giving any observable difference for SL11.

		Student Learning 11		Total
		Thinking	**Feeling**	
	17-21 yrs	42	50	92
	22-26 yrs	43	85	128
	27-31 yrs	36	66	102
Age Group	32-36 yrs	36	57	93
	37-41 yrs	12	18	30
	42-46 yrs	16	19	35
	>47 yrs	8	12	20
Total		193	307	500

Table 4.55: Age Group * Student Learning 11

In the survey conducted 38.6% of students chose **thinking** (*I am rational and logical*) whilst 61.4% chose **feeling** (*I am practical and down to earth*) at the present time of their study.

Of the ninety two (92) students in the seventeen to twenty one age group, 45.7% chose Thinking and 54.3% chose Feeling. Of the one hundred and twenty eight (128) students in the age group twenty two and twenty six years, 33.6% chose Thinking while 66.4% chose Feeling. Of the one hundred and two (102) students within the twenty seven to thirty one age group, 35.3% chose Thinking whilst 64.7% chose Feeling. In the age group of thirty two to thirty six, of the ninety three (93) students surveyed 38.7% chose Thinking while 61.3% chose Feeling. The thirty (30) students in the age group thirty seven to forty one 40% chose Thinking and 60% chose Feeling. Of the thirty five (35) students in the forty two to forty six years category, 45.7% preferred chose Thinking and 54.3% chose Feeling and the twenty (20) students who fell within the greater than forty seventy years category, 40% chose Thinking and 60% chose Feeling. According to Honey and Mumford's learning styles cycle, there was a strong indication that the students tend to be pragmatist (feeling) whereby they are *practical and down to earth* instead of *rational and logical* as illustrated in the graph below.

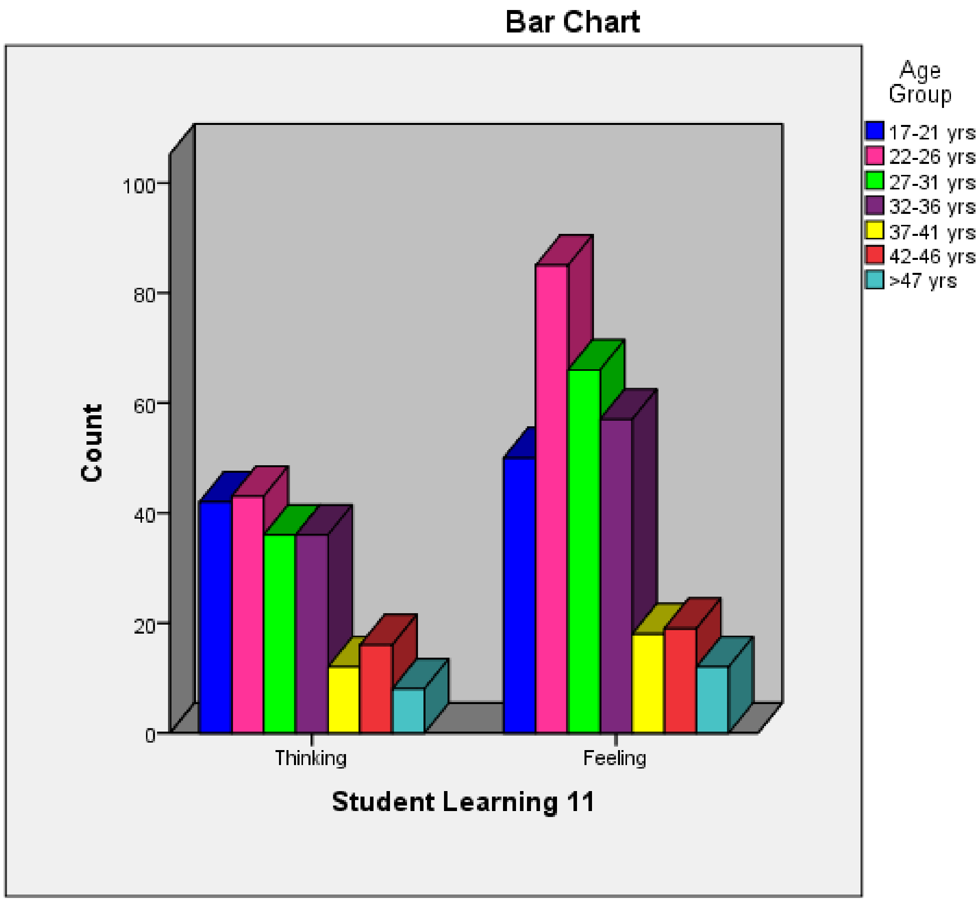


Fig 4.77: Age Group * Student Learning 11

The two variables used in this test were Age Group and Student Learning 12:

SL12: Thinking - I plan events down to the last detail. **Feeling** - I like realistic, but flexible plans.

The results of this cross tabulation gave the following:

χ^2 (6) = 5.475, p =0.485; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Age Group is not giving any observable difference for SL12.

In the survey conducted 31% of students were **thinking** (I plan events down to the last detail) whilst 69% were **feeling** (I like realistic, but flexible plans) at the present time of their study.

Of the ninety two (92) students in the seventeen to twenty one age group, 31.5% chose Thinking and 68.5% chose Feeling. Of the one hundred and twenty eight (128) students in the age group twenty two and twenty six years, 26.6% chose Thinking while 73.4% chose Feeling. Of the one hundred and two (102) students within the twenty seven to thirty one age group, 36.3% chose Thinking whilst 63.7% chose Feeling. In the age group of thirty two to thirty six, of the ninety three (93) students surveyed 25.8% chose Thinking while 74.2% chose Feeling. The thirty (30) students in the age group thirty seven to forty one 36.7% chose Thinking and 63.3% chose Feeling. Of the thirty five (35) students in the forty two to forty six years category, 40% preferred chose Thinking and 60% chose Feeling and the twenty (20) students who fell within the greater than forty seventy years category, 30% chose Thinking and 70% chose Feeling. According to Honey and Mumford's learning styles cycle, there was a strong indication that the students tend to be pragmatist (feeling) whereby they like realistic, but flexible plans instead of planning events down to the last detail as illustrated in the graph below.

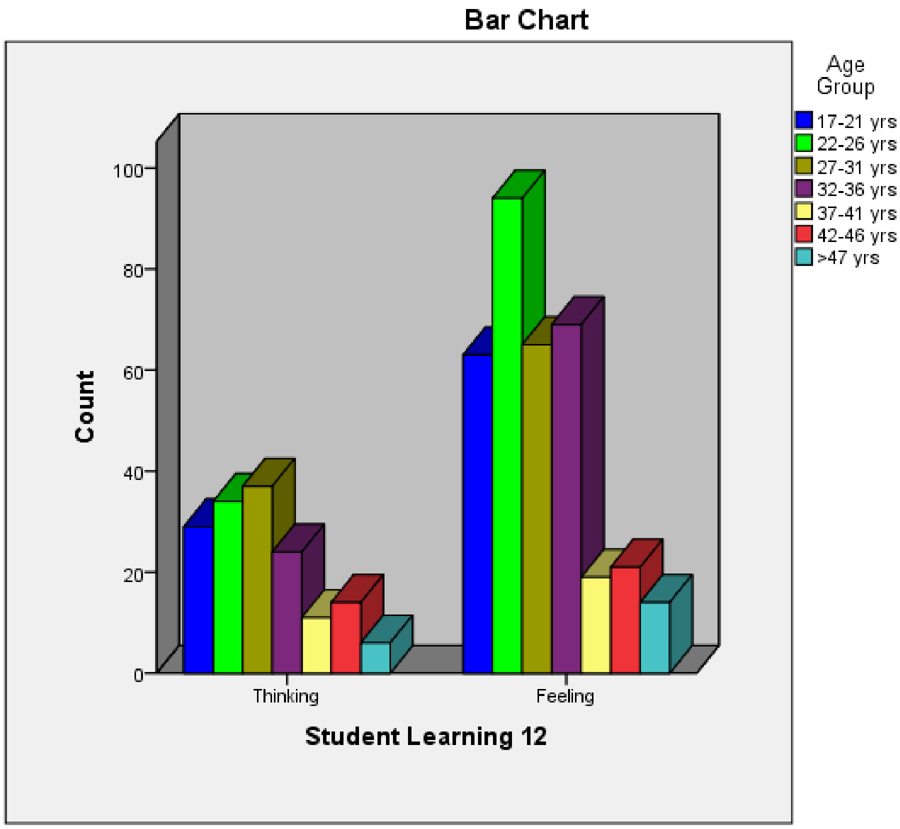


Fig 4.78: Age Group * Student Learning 12

The two variables used in this test were Age Group and Student Learning 13:

SL13: Thinking - I like to know the right answers before trying something new.

Feeling - I try things out by practicing to see if they work.

The results of this cross tabulation gave the following:

χ^2 (6) = 2.984, p =0.811; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Age Group is not giving any observable difference for SL13.

		Student Learning 13		Total
		Thinking	**Feeling**	
Age Group	17-21 yrs	44	48	92
	22-26 yrs	60	68	128
	27-31 yrs	50	52	102
	32-36 yrs	42	51	93
	37-41 yrs	13	17	30
	42-46 yrs	17	18	35
	>47 yrs	13	7	20
Total		**239**	**261**	**500**

Table 4.56: Age Group * Student Learning 13

In the survey conducted 47.8% of students were **thinking** (*I like to know the right answers before trying something new*) whilst 52.2% were **feeling** (*I try things out by practicing to see if they work*) at the present time of their study.

Of the ninety two (92) students in the seventeen to twenty one age group, 47.8% chose Thinking and 52.2% chose Feeling. Of the one hundred and twenty eight (128) students in the age group twenty two and twenty six years, 46.9% chose Thinking while 53.1% chose Feeling. Of the one hundred and two (102) students within the twenty seven to thirty one age group, 49% chose Thinking whilst 51% chose Feeling. In the age group of thirty two to thirty six, of the ninety three (93) students surveyed 45.2% chose Thinking while 54.8% chose Feeling. The thirty (30) students in the age group thirty seven to forty one 43.3% chose Thinking and 56.7% chose Feeling. Of the thirty five (35) students in the forty two to forty six years category, 48.6% preferred chose Thinking and 51.4% chose Feeling and the twenty (20) students who fell within the greater than forty seventy years category, 65% chose Thinking and 35% chose Feeling. According to Honey and Mumford's learning styles cycle, there is no significant margin to indicate that students prefer to plan the next stage (Feeling) as opposed to conclude from an experience (Thinking) as shown in the graph below.

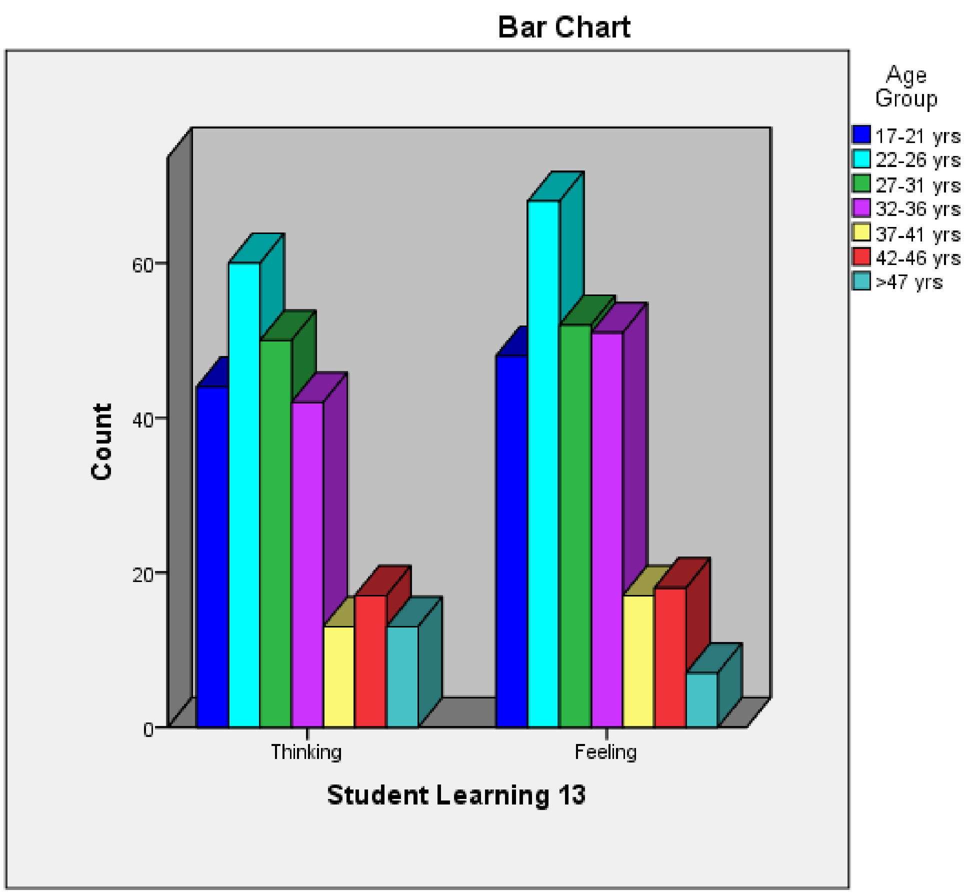


Fig 4.79: Age Group * Student Learning 13

The two variables used in this test were Age Group and Student Learning 14:

SL14: Thinking - I analyze reports to find the basic assumptions and inconsistencies. **Feeling** - I rely upon others to give me the basic gist of reports.

The results of this cross tabulation gave the following:

χ^2 (6) = 9.454, p =0.150; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Age Group is not giving any observable difference for SL14.

In the survey conducted 77.4% of students chose **thinking** (I *analyze reports to find the basic assumptions and inconsistencies*) whilst 22.6% chose **feeling** (*I rely upon others to give me the basic gist of reports*) at the present time of their study.

Of the ninety two (92) students in the seventeen to twenty one age group, 73.9% chose Thinking and 26.1% chose Feeling. Of the one hundred and twenty eight (128) students in the age group twenty two and twenty six years, 75.8% chose Thinking while 24.2% chose Feeling. Of the one hundred and two (102) students within the twenty seven to thirty one age group, 81.4% chose Thinking whilst 18.6% chose Feeling. In the age group of thirty two to thirty six, of the ninety three (93) students surveyed 80.6% chose Thinking while 19.4% chose Feeling. The thirty (30) students in the age group thirty seven to forty one 60% chose Thinking and 40% chose Feeling. Of the thirty five (35) students in the forty two to forty six years category, 80% preferred chose Thinking and

20% chose Feeling and the twenty (20) students who fell within the greater than forty seventy years category, 90% chose Thinking and 10% chose Feeling. According to Honey and Mumford's learning styles cycle, there was a strong indication that the students tend to be theorists (thinking) whereby they prefer to analyze reports to find the basic assumptions and inconsistencies instead of relying upon others to give me the basic gist of reports as illustrated in the graph below.

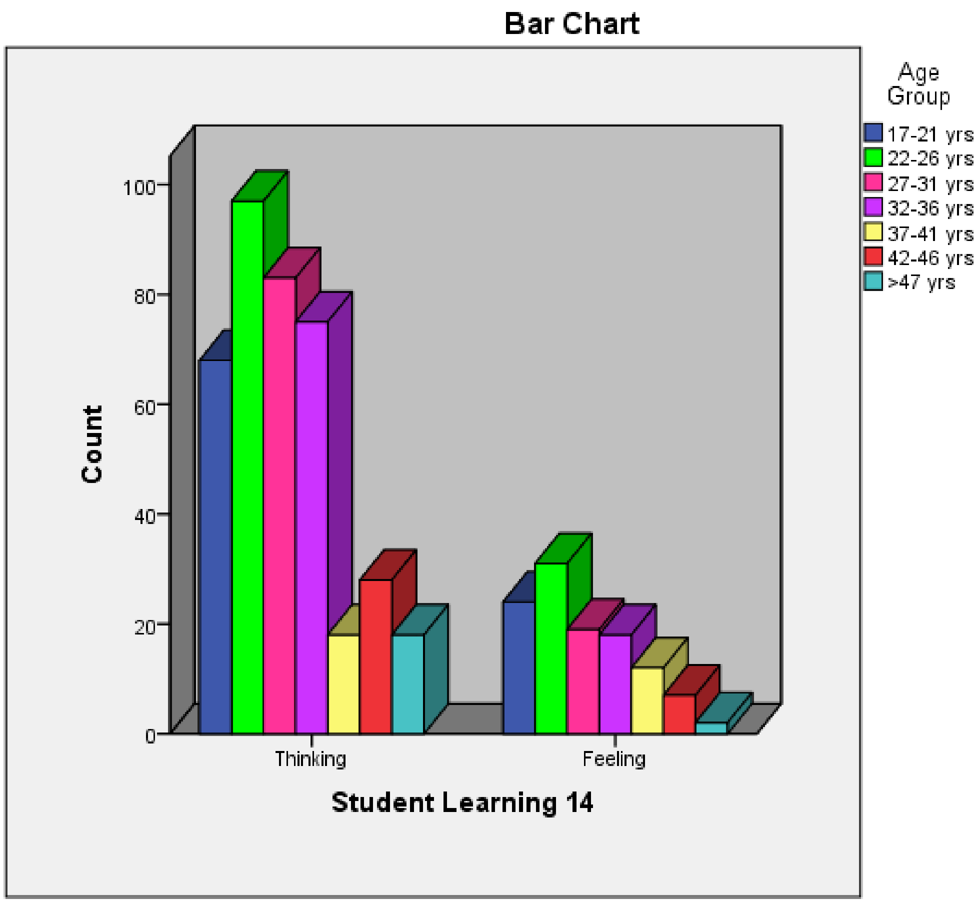


Fig 4.80: Age Group * Student Learning 14

The two variables used in this test were Age Group and Student Learning 15:

SL15: Thinking - I prefer working alone. **Feeling** - I enjoy working with others.

The results of this cross tabulation gave the following:

χ^2 (6) = 3.393, p =0.758; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Age Group is not giving any observable difference for SL15.

In the survey conducted 58.2% of students chose **thinking** (I prefer working alone) whilst 41.8% chose **feeling** (- I enjoy working with others) at the present time of their study.

Of the ninety two (92) students in the seventeen to twenty one age group, 58.7% chose Thinking and 41.3% chose Feeling. Of the one hundred and twenty eight (128) students in the age group twenty two and twenty six years, 60.2% chose Thinking while 39.8% chose Feeling. Of the one hundred and two (102) students within the twenty seven to thirty one age group, 62.7% chose Thinking whilst 37.3% chose Feeling. In the age group of thirty two to thirty six, of the ninety three (93) students surveyed 50.5% chose Thinking while 49.5% chose Feeling. Of the thirty (30) students in the age group thirty seven to forty one 56.7% chose Thinking and 43.3% chose Feeling. Of the thirty five (35) students in the forty two to forty six years category, 57.1% preferred chose Thinking and 42.9% chose Feeling and the twenty (20) students who fell within the greater than forty seventy years category, 60% chose Thinking and 40% chose Feeling.

According to Honey and Mumford's learning styles cycle, there was a strong indication that the students tend to be theorists (thinking) whereby they prefer working alone instead of enjoying working with others as illustrated in the graph below.

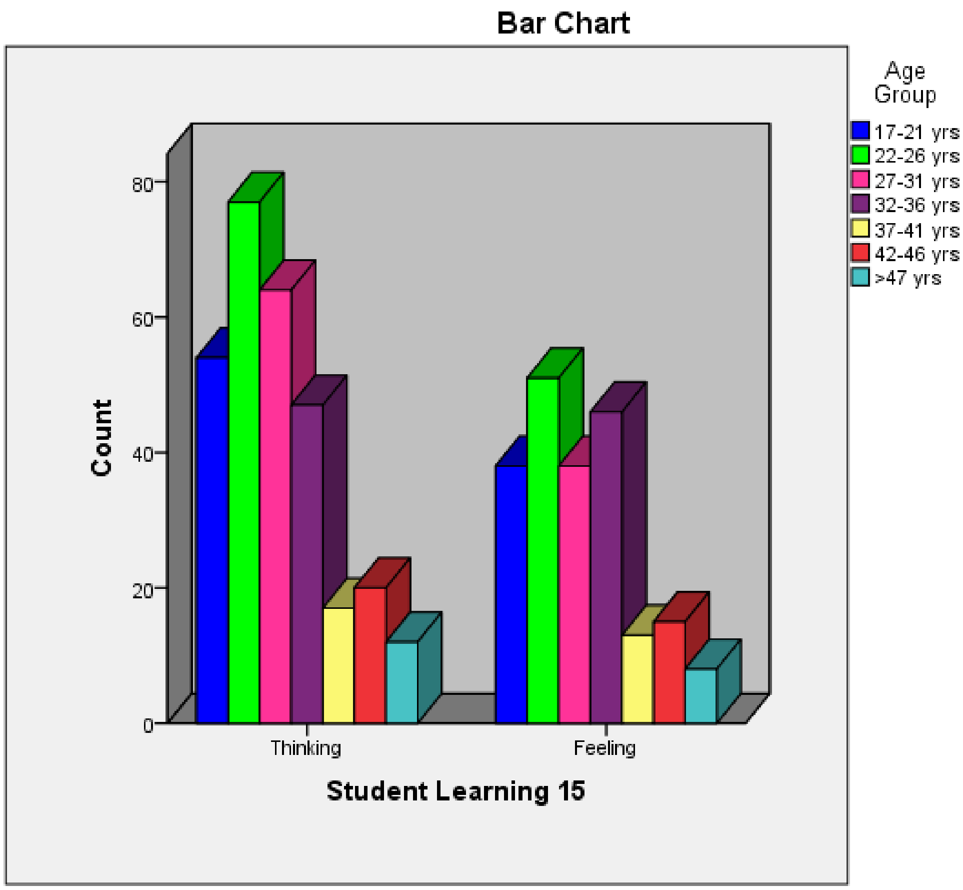


Fig 4.81: Age Group * Student Learning 15

The two variables used in this test were Age Group and Student Learning 16:

SL16: Thinking - Others would describe me as serious, reserved, and formal. **Feeling** - Others would describe me as verbal, expressive, and informal.

The results of this cross tabulation gave the following:

χ^2 (6) = 7.288, p =0.295; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Age Group is not giving any observable difference for SL16.

In the survey conducted 52.6% of students chose **thinking** (Others would describe me as serious, reserved, and formal) whilst 47.4% chose **feeling** (Others would describe me as verbal, expressive, and informal) at the present time of their study.

Of the ninety two (92) students in the seventeen to twenty one age group, 46.7% chose Thinking and 53.3% chose Feeling. Of the one hundred and twenty eight (128) students in the age group twenty two and twenty six years, 46.9% chose Thinking while 53.1% chose Feeling. Of the one hundred and two (102) students within the twenty seven to thirty one age group, 53.9% chose Thinking whilst 46.1% chose Feeling. In the age group of thirty two to thirty six, of the ninety three (93) students surveyed 55.9% chose Thinking while 44.1% chose Feeling. Of the thirty (30) students in the age group thirty seven to forty one 60% chose Thinking and 40% chose Feeling. Of the thirty five (35) students in the forty two to forty six years category, 60% preferred chose Thinking and 40% chose Feeling and the twenty (20) students who fell within the greater than forty seventy years category, 70% chose Thinking and 30% chose Feeling.

According to Honey and Mumford’s learning styles cycle, Students from the age of seventeen to thirty six there is no significant margin to indicate that students prefer to plan the next stage (Feeling) as opposed to conclude from an experience (Thinking). Students that fell in the ages from thirty seven to over forty seven, that there was a strong indication that the students tend to be pragmatist (feeling) where Others would describe me as serious, reserved, and formal instead Others would describe me as verbal, expressive, and informal as illustrated in the graph below.

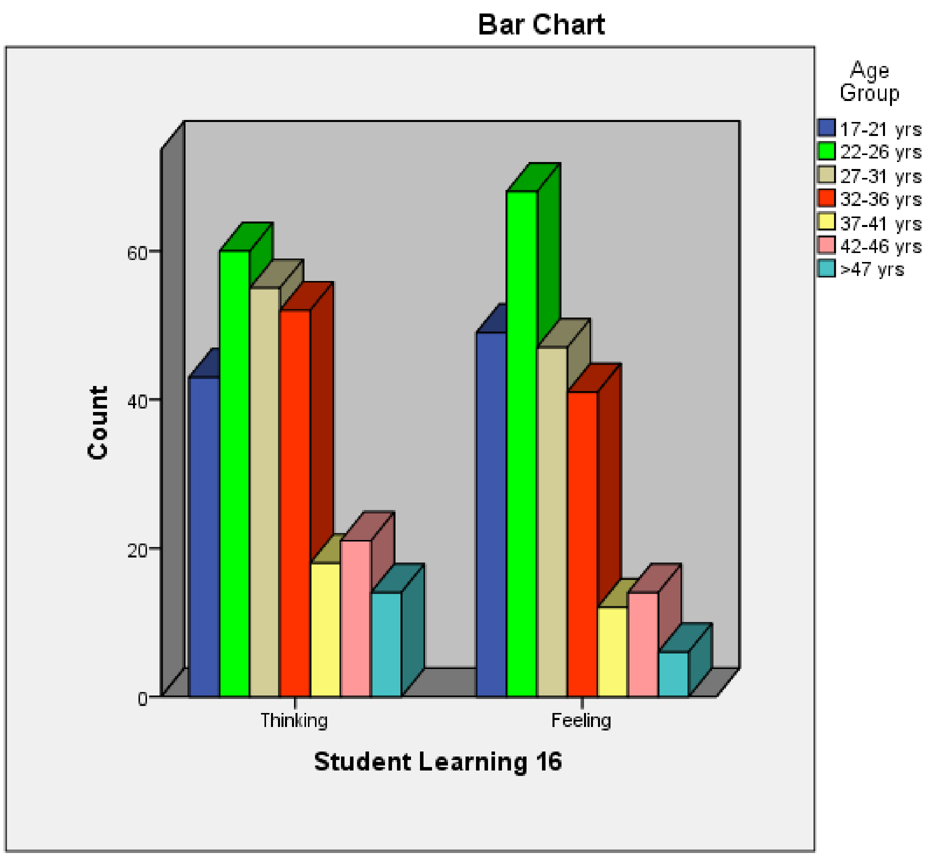


Fig 4.82: Age Group * Student Learning 16

The two variables used in this test were Age Group and Student Learning 17:

SL17: Thinking - I use facts to make decisions. **Feeling** - I use feelings to make decisions.

The results of this cross tabulation gave the following:

χ^2 (6) = 5.729, p =0.454; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Age Group is not giving any observable difference for SL17.

In the survey conducted 77% of students were **thinking** (I use facts to make decisions) whilst 23% were **feeling** (I use feelings to make decisions) at the present time of their study.

Of the ninety two (92) students in the seventeen to twenty one age group, 71.7% chose Thinking and 28.3% chose Feeling. Of the one hundred and twenty eight (128) students in the age group twenty two and twenty six years, 74.2% chose Thinking while 25.8% chose Feeling. Of the one hundred and two (102) students within the twenty seven to thirty one age group, 75.5% chose Thinking whilst 24.5% chose Feeling. In the age group of thirty two to thirty six, of the ninety three (93) students surveyed 80.6% chose Thinking while 19.4% chose Feeling. Of the thirty (30) students in the age group thirty seven to forty one 83.3% chose Thinking and 16.7% chose Feeling. Of the thirty five (35) students in the forty two to forty six years category, 85.7% preferred chose

Thinking and 14.3% chose Feeling and the twenty (20) students who fell within the greater than forty seventy years category, 85% chose Thinking and 15% chose Feeling. According to Honey and Mumford's learning styles cycle, there was a strong indication that the students tend to be theorists (feeling) whereby they use facts to make decisions instead of using feelings to make decisions as illustrated in the graph below.

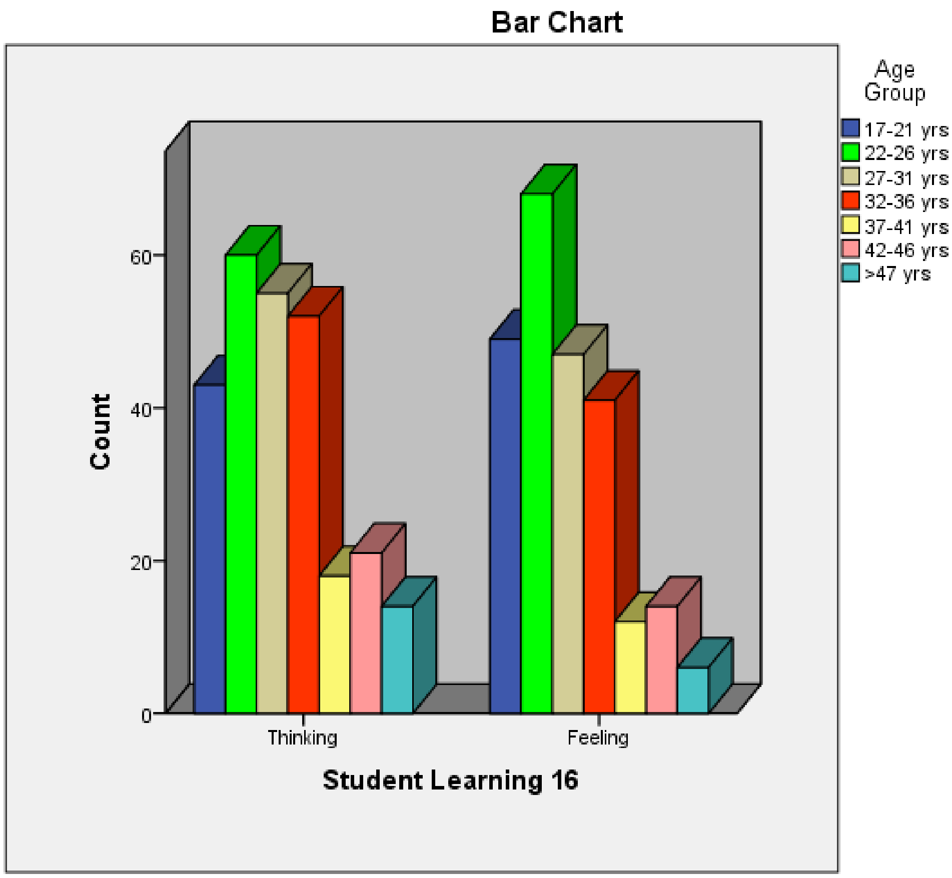


Fig 4.83: Age Group * Student Learning 17

The two variables used in this test were Age Group and Student Learning 18:

SL18: Thinking - I am difficult to get to know. **Feeling** - I am easy to get to know.

The results of this cross tabulation gave the following:

χ^2 (6) = 2.882, p =0.823; H_0 = accepted

There was no observable difference in responses therefore the null hypothesis, H_0, has been accepted. This indicates that the Age Group is not giving any observable difference for SL18.

			Student Learning 18		Total
			Thinking	**Feeling**	
Age Group	**17-21 yrs**	Count	32	60	92
		% within Age Group	**34.8%**	**65.2%**	100.0%
	22-26 yrs	Count	40	88	128
		% within Age Group	**31.2%**	**68.8%**	100.0%
	27-31 yrs	Count	35	67	102
		% within Age Group	**34.3%**	**65.7%**	100.0%
	32-36 yrs	Count	23	70	93
		% within Age Group	**24.7%**	**75.3%**	100.0%
	37-41 yrs	Count	10	20	30
		% within Age Group	**33.3%**	**66.7%**	100.0%
	42-46 yrs	Count	11	24	35
		% within Age Group	**31.4%**	**68.6%**	100.0%
	>47 yrs	Count	6	14	20
		% within Age Group	**30.0%**	**70.0%**	100.0%
Total		Count	157	343	500
		% within Age Group	**31.4%**	**68.6%**	100.0%

Table 4.57: Age Group * Student Learning 18

In the survey conducted 31.4% of students were **thinking** (I am difficult to get to know) whilst 68.6% were **feeling** (I am easy to get to know) at the present time of their study.

Of the ninety two (92) students in the seventeen to twenty one age group, 34.8% chose Thinking and 65.2% chose Feeling. Of the one hundred and twenty eight (128) students in the age group twenty two and twenty six years, 31.2% chose Thinking while 68.8% chose Feeling. Of the one hundred and two (102) students within the twenty seven to thirty one age group, 34.3% chose Thinking whilst 65.7% chose Feeling. In the age group of thirty two to thirty six, of the ninety three (93) students surveyed 24.7% chose Thinking while 75.3% chose Feeling. Of the thirty (30) students in the age group thirty seven to forty one 33.3% chose Thinking and 66.7% chose Feeling. Of the thirty five (35) students in the forty two to forty six years category, 31.4% preferred chose Thinking and 68.6% chose Feeling and the twenty (20) students who fell within the greater than forty seventy years category, 30% chose Thinking and 70% chose Feeling. According to Honey and Mumford's learning styles cycle, there was a strong indication that the students tend to be pragmatist (feeling) whereby they are easy to get to know instead of difficult to get to know as illustrated in the graph below.

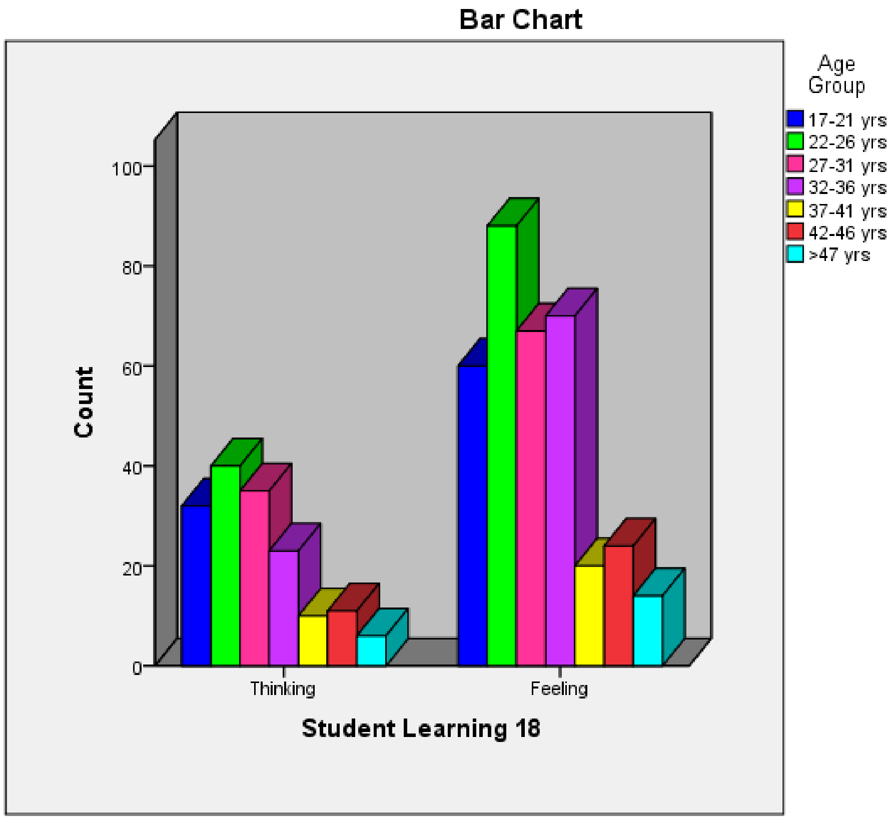


Fig 4.84: Age Group * Student Learning 18

In the survey conducted for the two variables at the start of their study as well as at the present time of study. For **SL10** 45.8% of students chose **Thinking** (I ask probing questions when learning a new subject) whilst 54.2% chose **Feeling** (I am good at picking up hints and techniques from other people). For **SL11,** it was seen that 38.6% of chose Thinking (I am rational and logical) while 61.4% chose **Feeling** (I am practical and down to earth). When **Student Learning 12** was examined it was found that 31% of students chose **Thinking** (I plan events down to the last detail) whilst 69% of the students surveyed preferred **Feeling** (I like realistic, but flexible plans). When **SL13** was investigated 47.8% of students chose **Thinking** (I like to know the right answers before trying something new) and the remaining 52.2%

chose **Feeling** (I try things out by practicing to see if they work). For **SL14**, there was a strong indication with 77.4% preferred **Thinking** (I analyze reports to find the basic assumptions and inconsistencies) while 22.6 preferred **Feeling** (I rely upon others to give me the basic gist of reports). When **Student Learning 15** was examined it was found that 58.5% of students opted for **Thinking** (I prefer working alone) and the remaining 41.8% chose **Feeling** (I enjoy working with others). When **SL16** was investigated 52.6% of students selected **Thinking** (Others would describe me as serious, reserved, and formal) whilst the other 47.4% selected **Feeling** - Others would describe me as verbal, expressive, and informal. For **SL17**, there was a strong indication with 77% of the students who participated in the survey preferred **Thinking** (I use facts to make decisions) while the remaining 23% preferred to go with **Feeling** (I use feelings to make decisions). When **Student Learning 18** was examined it was found that 31.4% of students opted for **Thinking** (I am difficult to get to know) and 68.6% preferred **Feeling** - I am easy to get to know.

Students fell into both categories of Honey and Mumford's learning style category of theorist as well as pragmatist. Honey and Mumford (2000) explained that in this category meant that the students demonstrate a practical approach to getting things done quickly. This type of student prefers to plan the next stage and usually connect the links between theory and practice and demonstrate their knowledge with practical applications in the classroom.

Students also fell into the category of theorist where Honey and Mumford (2000) explained that in this category meant that the student is analytical and methodical in nature. This type of student prefers to conclude from an experience.

The main aim of Section Two was to investigate whether students preferred **Doing** or **Watching** on Kolb's processing continuum with reference to the variables of area of study, year of study, option of study, age group and IT skills (at the start and at present).

The data collected indicated that a higher percentage of students preferred Doing -. having an experience and these students fell into Honey and Mumford's learning style category of Activist. Honey and Mumford (2000) explained that in this category meant that the students learn by doing. This type of student has an open-minded approach to learning, involving him/her fully and without basis in new experiences. They also prefer the challenges of new experiences, involvement with others, assimilation and role playing. Other students preferred the Watching ie reviewing the experience. These students fell into Honey and Mumford's learning style category of the reflector. Honey and Mumford (2000) explained that in this category the students prefer to learn from activities that allow watching as well as thinking and they also need to review what has happened through brainstorming and in cooperative groups. Students in this category also prefer to view situations from various perspectives.

Whilst the main aim of Section Three was to investigate whether students preferred **Thinking** or **Feeling** on Kolb's perception continuum with reference to the variables area of study, year of study, option of study, age group and IT skills (at the start and at present). This section differentiated whether students fell into the category of theorist (thinking) or pragmatist (feeling). According to Honey and Mumford (2000) in the theorist learning style the students like to understand the theory behind the actions. They need to understand models, concepts and facts in order to engage in the learning process. They tend to prefer to analyze and synthesize, drawing new information into a systematic and logical 'theory'. On the other hand, with the pragmatist learning style, Honey and Mumford (2000) explain that these students need to be able to see how to put the learning into practice into the real world. Abstract concepts are of limited use to these students unless they can see a way to put the idea into action in the real world.

The combination of two lines of axis (continuums) each formed between Kolb (1985) 'grasping an experience' (Doing/watching) and 'transforming an experience' (thinking/feeling) defined the preferred learning style of the student as illustrated in Table 24

Doing/Watching	***Thinking/Feeling***	***Preferred Learning Style***
Watching	Feeling	Reflector
Doing	Feeling	Activist
Watching	Thinking	Theorist
Doing	Thinking	Pragmatist

Table 4.58: Preferred Learning Style: Honey and Mumford (2000)

4.5 LEARNING STYLE

4.5.1 AREA OF STUDY AND LEARNING STYLE

Fig 16 illustrates that the highest percentage of students for both the Business and Information Technology courses fall in the **Activist** category of learning style where it was found that these students as proposed by Honey and Mumford (2000) preferred the combination of doing and feeling. This is reflected in the classroom where the students prefer project work and articulating their thoughts and conclusions from discussions via presentations as these category of students prefer to have an experience as they are happy to have a go at new things and they like to get involved and participate in activities as identified from the responses in Sections 2 and 3 of the questionnaire. It is also observed by lecturers that these students find difficulty in rigidly following instructions.

The second highest percentage of students for Business and Information Technology fell into the **theorist** category, as illustrated in Fig 16, which indicates that students tend to assimilate information before concluding from an experience. From sections 2 and 3 of the questionnaire distributed, these students as proposed by Honey and Mumford (2000) preferred a combination of watching and thinking. In this category, the students in the classroom would ask probing questions when learning a new subject and they also tend to be rational and logical in their thought patterns. It was also observed that in the classroom the theorist category of students would analyze reports to understand the basic assumptions and inconsistencies as they are usually thorough and methodical in their approach as identified from the responses in Sections 2 and 3 of the questionnaire.

Students who fell into the **reflector** learning style category differed in the area of study. A higher percentage of IT students (25%) were found to be in this category as opposed to 15% in the Business Management course. Students in this category as proposed by Honey and Mumford (2000) tend to prefer the combination of watching and feeling –that is – reviewing an experience. As identified from the responses in Sections 2 and 3 of the questionnaire, in the classroom, the reflector students usually prefer to investigate a new topic thoroughly by doing painstaking research before starting a project and they also draw up lists of possible courses of actions when starting a new project that are realistic but flexible.

It is seen in Fig 4.85 that an equal percentage of students from both the Business Management and Information Technology courses fell into the fourth category – the **pragmatist**. This type of student prefer the combination of doing and thinking , that is, they are more concerned with the planning of the next phase as explained by Honey and Mumford (2000). The pragmatist students in the classroom usually connect the links between theory and practice and usually demonstrate their knowledge with practical applications. They hardly participate in the classroom discussion if there is no clear end point. They normally use facts before making decisions.

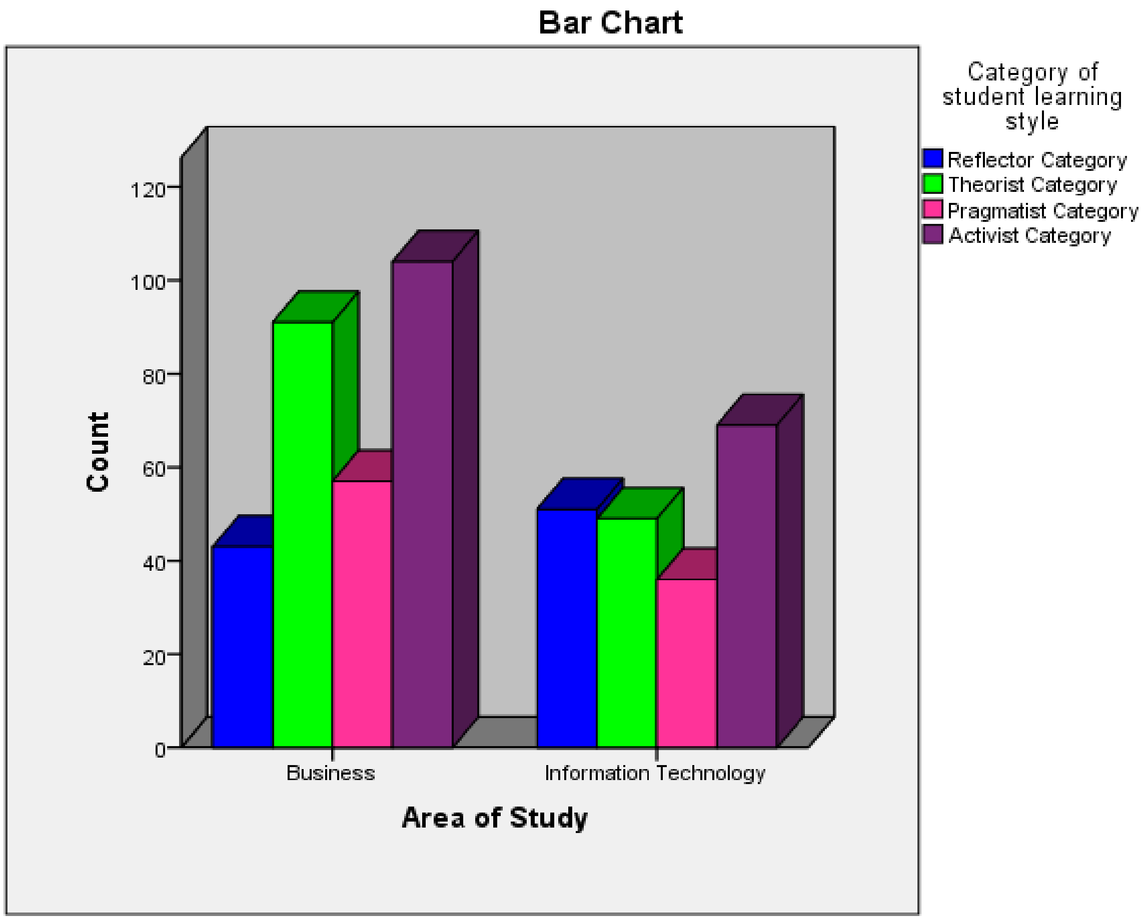


Fig 4.85: Area of Study vs Category of Student Learning Style

4.3.2 Option of Study and learning style

		Category of student learning style				Total
		Reflector Category	**Theorist Category**	**Pragmatist Category**	**Activist Category**	
Option of Study	**Full Time**	**20**	**19**	**17**	**35**	**91**
	Part Time	**23**	**23**	**19**	**28**	**93**
	Saturday	**51**	**98**	**57**	**110**	**316**
Total		**94**	**140**	**93**	**173**	**500**

Table 4.59: Option of Study * Category of student learning style

Of School of Accounting and Management's three options, it is observed from student registration that the largest number of students attends Saturday classes which were reflective of the data collection sample of questionnaires distributed and returned. Whilst there was an equal distribution of students between part time and full time option of study.

The highest percentage of the students in all three study options was predominantly the activist learner whilst the reflector type student accounted for the second most popular learning style. The other two learning styles – theorist and pragmatist – basically had equal percentages as illustrated in Table 4.59. The statistics indicate that the type of learning style did not vary dependant on the option of study in that the activist type student was seen as the preferred learning style across all three study options and the same can be said for the other three learning styles.

4.5.2 YEAR OF STUDY AND LEARNING STYLE

Fig 4.86 illustrates the undergraduate students (inclusive of Years 1, 2 and 3) and postgraduate (inclusive of MSc and MBA) and the category of learning styles they demonstrate. Undergraduate students studying both Business Management and Information Technology courses exhibited the activist category as their predominant learning style followed by the theorist category. Whilst the postgraduate students demonstrated a reverse in their choice (ie theorist was most favoured followed by activist).This can be attributed to the fact that the postgraduate students tend to prefer to conclude from an experience.

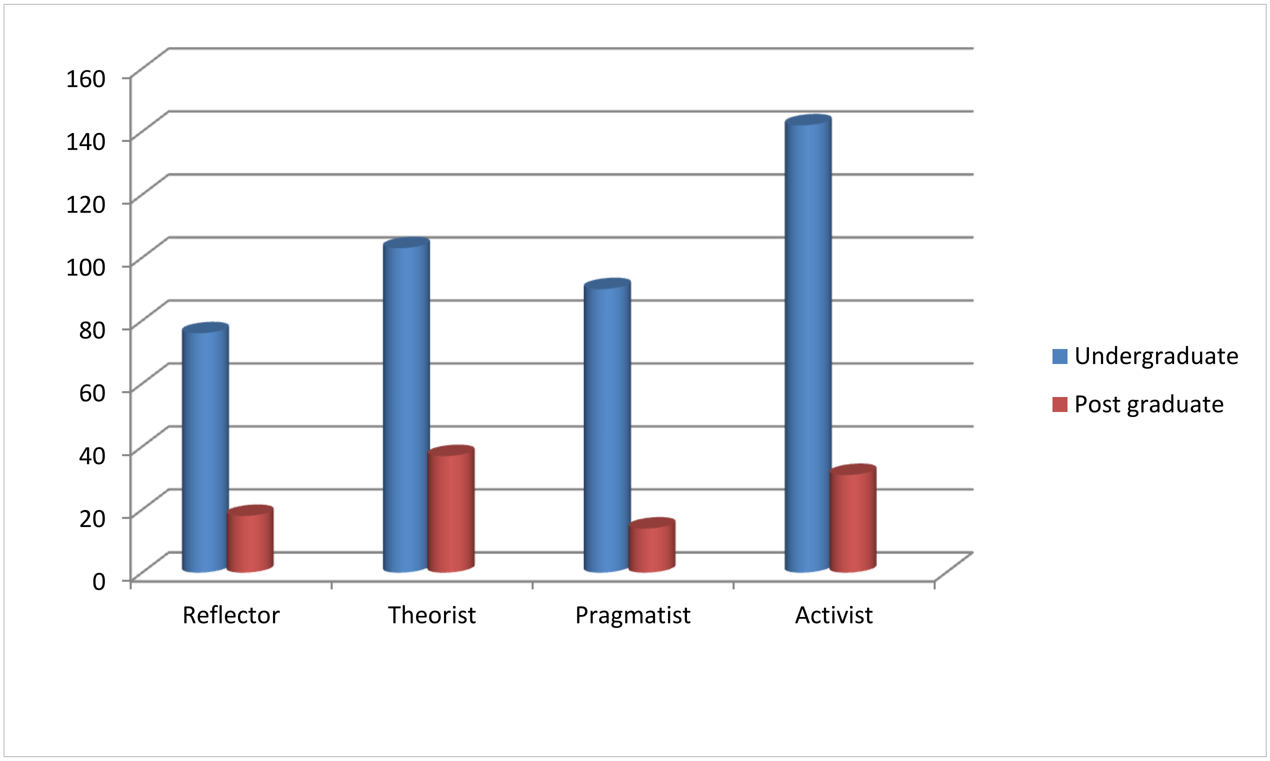


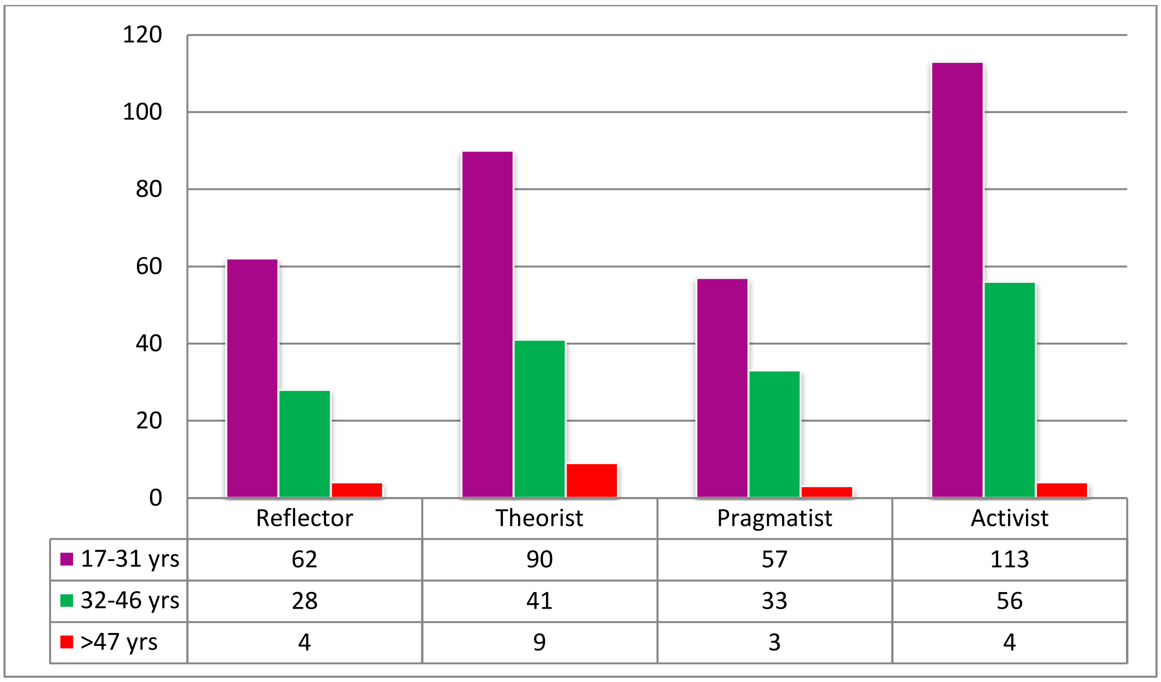
Fig 4.86: Year of Study * Category of student learning style

They are inclined towards watching and thinking, for example, from the responses of the questions in sections 2 and 3 in the questionnaire the postgraduate students answered *'I like to know the right answers before trying something new'* and *'I analyze reports to find the basic assumptions and inconsistencies'* as well as *'I draw up lists of possible courses of actions when starting a new project'*.

With the undergraduate students, it was observed that their predominant learning style was the activist category and this can be attributed to undergraduates prefer to have an experience ie. Doing and watching. From the responses received from the questionnaire, the undergraduate students indicated that they like to try new and different things without too much preparation and they also were happy to have a go at new things. Their responses also indicated that they tend to like realistic but flexible plans.

The other two learning styles – theorist and pragmatist – basically had equal percentages as illustrated Fig 4.86.

4.5.3 AGE GROUP AND LEARNING STYLE



	Reflector	Theorist	Pragmatist	Activist
17-31 yrs	62	90	57	113
32-46 yrs	28	41	33	56
>47 yrs	4	9	3	4

Fig 4.87: Age Group vs Learning Style Category

For the purpose of this section, the age groups are amalgamated into three categories – 17-31 years, 32-46 years and older than 47 – as illustrated in the above graph, Fig 4.87.

For the age group 17 -31 and 32- 46 years, the predominant learning style was that of the activist followed by the theorist. However, for the ages 17-31 years, the reflector was chosen as the third followed closely by the pragmatist. The inverse is true for students between the ages of 32 -46 years (pragmatist then the reflector).

The results varied for the last category, students older than 47 years. This was the smallest group which accounted for 4% of the students sampled. The most preferred learning style was that of the theorist followed by an equal distribution of 20% for activist and reflector, while the pragmatist followed closely behind.

For the oldest age group (older than 47 years), 45% was found to be predominantly in the theorist category. This can be attributed to at this age these students prefer watching and thinking, they are assimilating the knowledge. From responses of the questionnaire, these students responded that they make cautious and logical decisions and they tend to investigate a new topic or process in depth before proceeding. They also indicated that they tend rely on others to give them the basic gist of a report as opposed to reading it themselves. While in the classroom they are also good about picking up hints and techniques from other people.

4.6 SECTION 4: USE OF ICT BY STUDENTS

It is to noted that in this section that the total number of responses is larger than the overall number of respondents (N=500) due to the majority of respondents reporting more than one responses.

4.6.1 USE OF COMPUTER APPLICATIONS

Technology is embedded into students' lives and students are generally inclined to use technology. However, technology has only a moderate influence on students' active involvement in particular courses or as a connector with other students and faculty (ECAR Study of undergraduate study and Information Technology, 2014).

Students throughout educational institutions consistently mention that several skills are required for their future, including spreadsheet design, graphics design, database setup and web design (McEuen, 2001).

In the questionnaire distributed, the question was asked 'What computer applications do you usually use?'

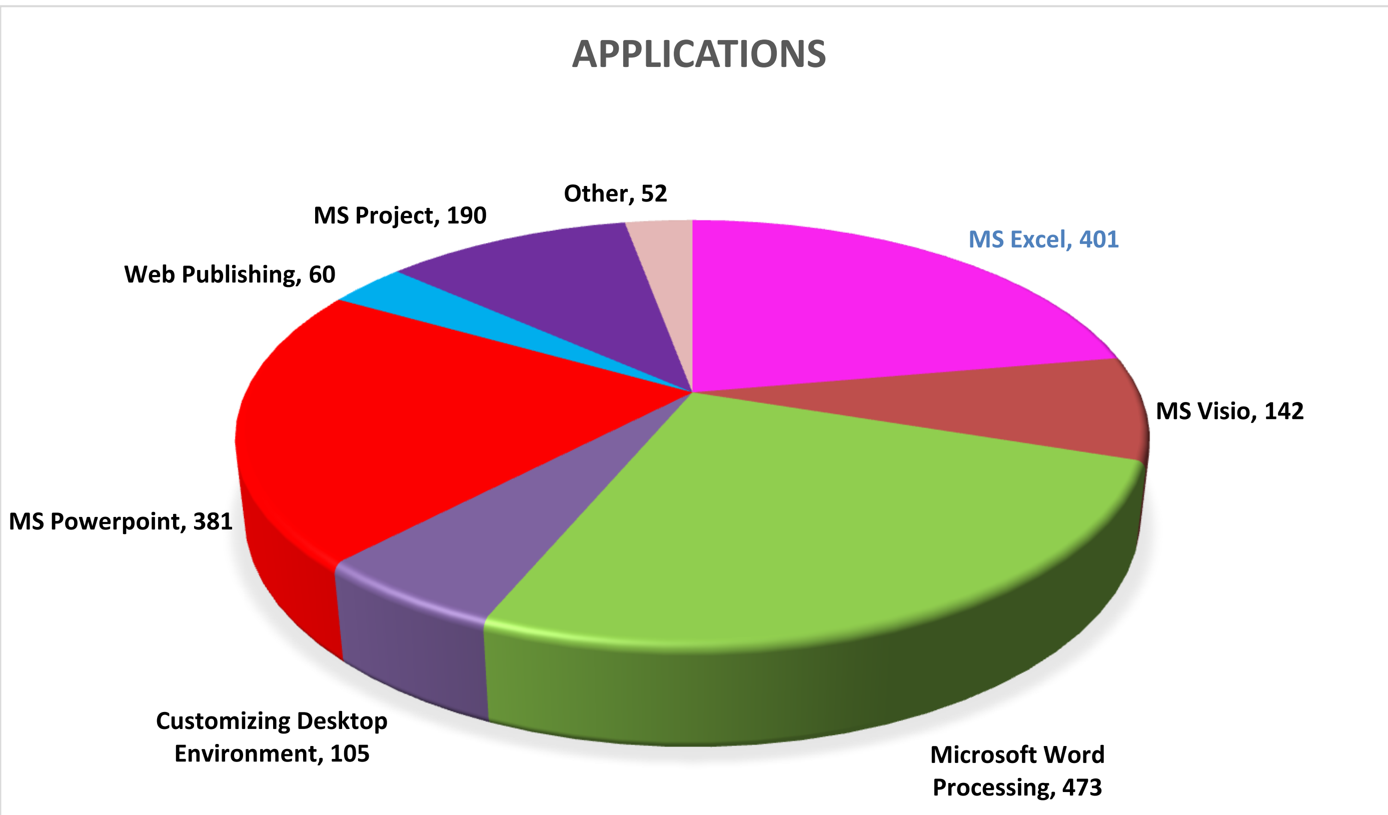


Fig 4.88: Types of Application used by students

From the five hundred students' responses, 95% of the student population surveyed – throughout all years of study and all options of study –use Microsoft Word processing application, the second most used application used generally by students is Microsoft Excel which accounted for 80% of student population. 76% of students overall use Powerpoint application. MS Visio generally 28% of students use this application, however, the Information Technology students use this application more frequently than the Business Management students as seen in Fig 4.89. Also, it was observed from the data collated that 38% of the students used MS Project and again it was seen that the the Information Technology students use this application more frequently than the Business Management students.

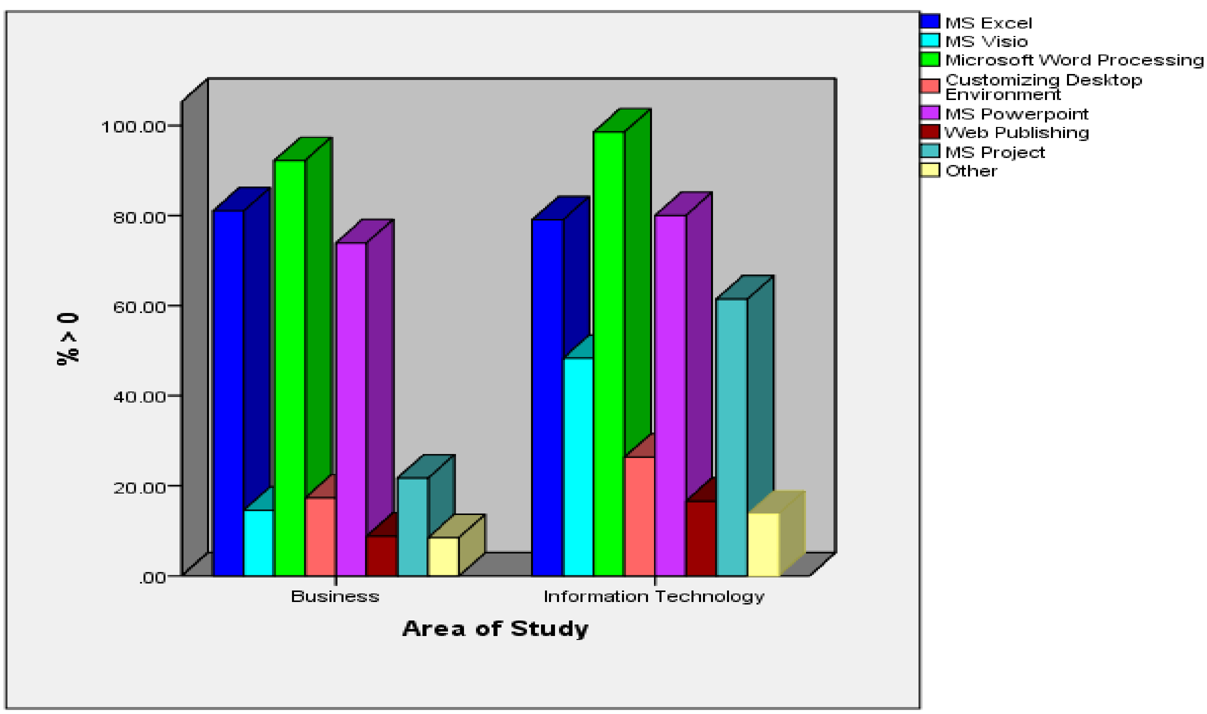
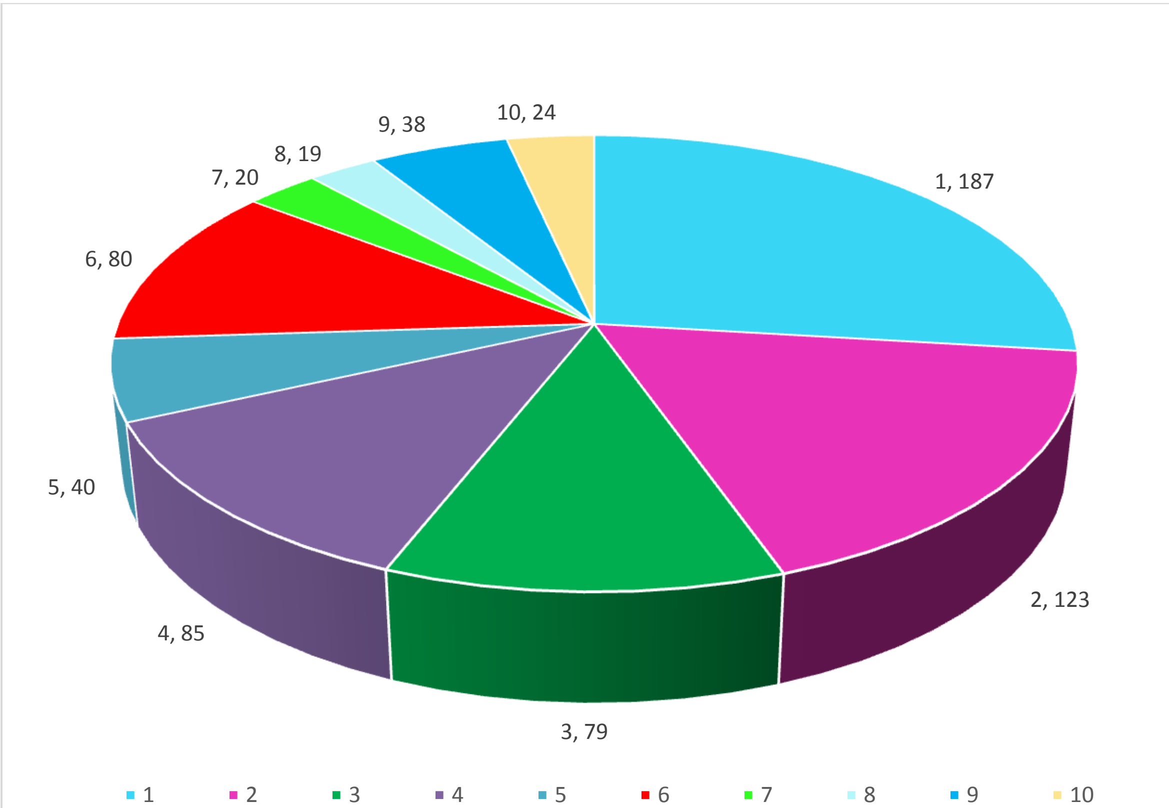


Fig 4.89: Use of Applications by Area of Study

4.6.2 THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN STUDENT LEARNING



1. Use of ICT has an impact on learning process
2. ICT accelerates learning process
3. Use of ICT improves grades
4. Teachers should use ICT during teaching
5. Feel fear from the use of ICT
6. Use of ICT for getting information is better than in the library
7. Know how to use ICT but not interested in using it for learning
8. Getting information from print material is better than using ICT
9. Cannot study without the use of ICT tools

10. **Find it time consuming to use ICT in learning**

(1- highest and 10 – lowest)

Fig 4.90: ICT Usage in Learning

		Frequency	Percent
Valid	1	187	37.4
	2	107	21.4
	3	52	10.4
	4	32	6.4
	5	27	5.4
	6	21	4.2
	7	20	4.0
	8	23	4.6
	9	14	2.8
	10	17	3.4
	Total	500	100.0

Table 4.60: Use of ICT has an impact on learning process

		Frequency	Percent
Valid	1	123	24.6
	2	132	26.4
	3	74	14.8
	4	43	8.6
	5	36	7.2
	6	30	6.0
	7	16	3.2
	8	19	3.8
	9	11	2.2
	10	16	3.2
	Total	500	100.0

Table 4.61: ICT accelerates learning process

Generally, from the survey of the 500 students both in the Business and Information technology courses 37.4% indicated that the 'Use of ICT has an impact on learning process' was the highest in their order of importance whilst 3.4% considered it as the least important as displayed in Table 4.60. When 'ICT accelerates learning process' is considered as another factor in the usage of ICT in learning 123 students (24.6%) described it as their highest whilst a slightly higher number (132) agreed that it was their second highest in their priority listing and 16 of the 500 identified it as number 10, the lowest as seen in Table 4.61.

Another factor that was considered was 'use of ICT improves grades', 23.8% (119 students) of the population surveyed identified it as their third highest in the priority listing whilst 4% indicated that this was the lowest factor that was considered in their opinion about the use of ICT in their learning. Another factor considered was 'Teachers should use ICT during teaching' 85 students stated it as their highest priority whilst 103 students placed it as number four in their listing of priority. On the other hand, 3.2% placed in at the bottom of their list.

'Feel fear from the use of ICT' as yet another factor looked at in the research, 43.6% identified this factor as the lowest in their opinion about the use of ICT in their learning.

Another factor considered in this research was 'Know how to use ICT but not interested in using it for learning' from the data collected. 18.2% (91 students) stated that it was their lowest priority in their opinion about the use of ICT in their learning followed by 16.8% saying it was number nine while 5.4% indicated that it was their highest priority in the list.

The factor considered was '*Getting information from print material is better than using ICT*' 20.6% (103 students) chose this factor as number seven as seen in Table 4.62 in the priority list while the second highest number 91 indicated that this factor was the lowest in the priority list. A minimal 3.8% chose this factor as their number one priority.

		Frequency	Percent
Valid	1	19	3.8
	2	24	4.8
	3	30	6.0
	4	37	7.4
	5	95	19.0
	6	61	12.2
	7	103	20.6
	8	70	14.0
	9	27	5.4
	10	34	6.8
	Total	500	100.0

Table 4.62: Getting information from print material is better than using ICT

Yet another factor considered was ‘cannot study without the use of ICT tools’. The data highlights that 15.6% (78 students) chose this factor as their number seven on the priority list.7.6% chose it as their highest and an equal number chose it as their lowest. The last factor considered, ‘find it time consuming to use ICT in learning’, showed higher numbers of students gave it a lower priority level of 8, 9 and10 while fewer students gave it a higher grade of 1, 2 or 3.

The majority of the Information Technology and Business Management students identified that the use of ICT has an impact on the learning process. 20% of the students surveyed articulated that teachers should use ICT during teaching whilst the smallest percentage said that they knew how to use ICT but was not interested in using it for learning in both areas of study as seen in Fig 22 below. Feel fear from the use of ICT accounted for 12% of students in Information Technology courses and 7.5% in Business Management.

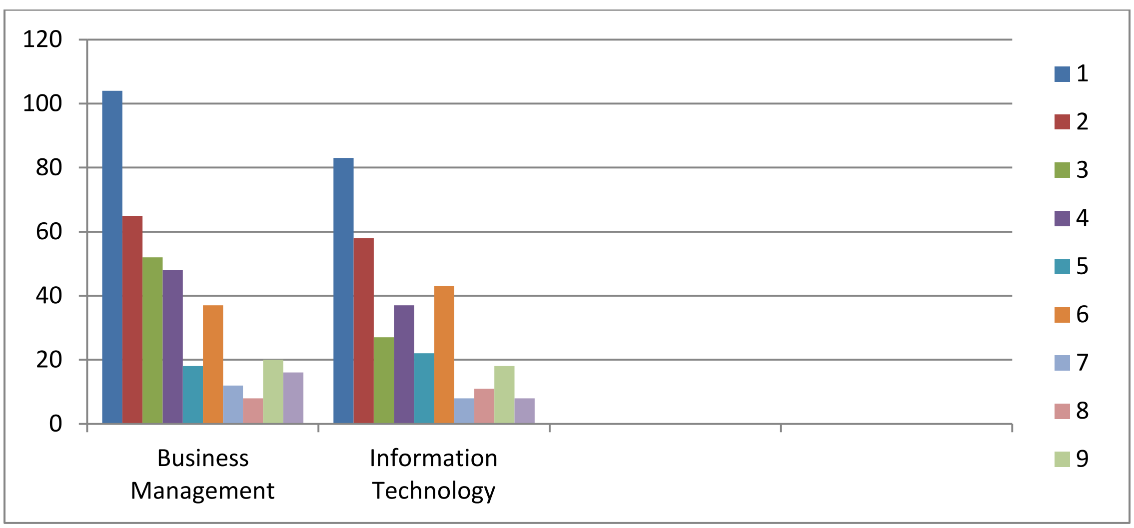


Fig 4.91: ICT Usage in Learning vs Area of Study

1. Use of ICT has an impact on learning process
2. ICT accelerates learning process
3. Use of ICT improves grades
4. Teachers should use ICT during teaching
5. Feel fear from the use of ICT
6. Use of ICT for getting information is better than in the library
7. Know how to use ICT but not interested in using it for learning
8. Getting information from print material is better than using ICT
9. Cannot study without the use of ICT tools
10. Find it time consuming to use ICT in learning

Students recognized that ICT accelerates the learning process as well as its use improves grades as illustrated in Fig 4.91.

For the purpose of this section, the year of study were merged into two distinct categories – undergraduate includes years 1, 2 and 3 and postgraduate which includes MBA and MSc students.

Students studying at all levels both undergraduate and postgraduate identified the top five factors of use of ICT in their learning as illustrated in Fig 4.92 are as follows:

- Use of ICT has an impact on learning process
- ICT accelerates learning process
- Teachers should use ICT during teaching
- Use of ICT for getting information is better than in the library
- Use of ICT improves grades

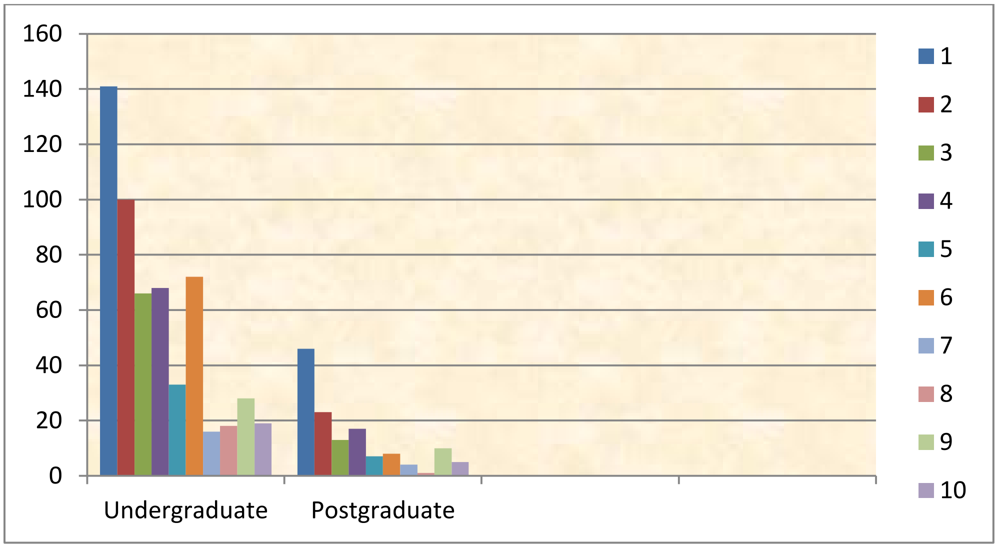


Fig 4.92: ICT Usage in Learning vs Year of Study

1. Use of ICT has an impact on learning process
2. ICT accelerates learning process
3. Use of ICT improves grades
4. Teachers should use ICT during teaching
5. Feel fear from the use of ICT
6. Use of ICT for getting information is better than in the library
7. Know how to use ICT but not interested in using it for learning
8. Getting information from print material is better than using ICT
9. Cannot study without the use of ICT tools
10. Find it time consuming to use ICT in learning

Whilst the least influential factors include:

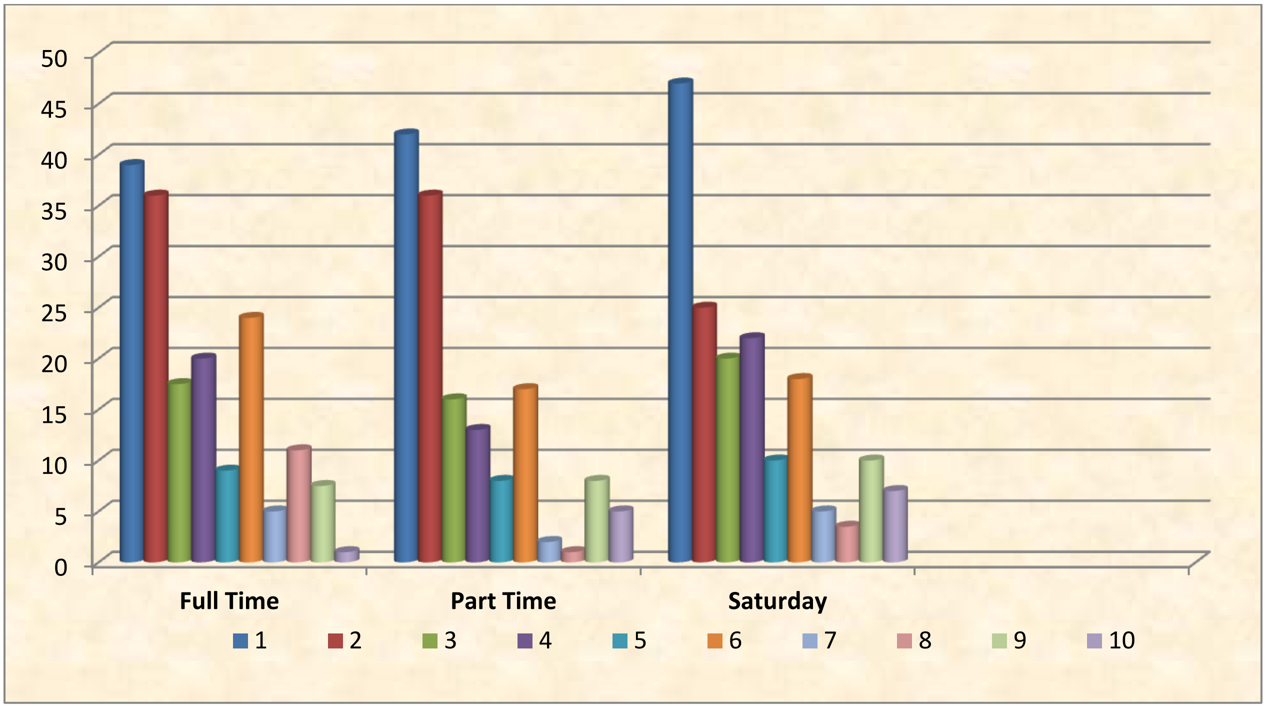
- Getting information from print material is better than using ICT
- Know how to use ICT but not interested in using if for learning

Students studying at all three options (full time, part time and Saturday) identified the top five factors of use of ICT in their learning as illustrated in Fig 4.93 are as follows:

- Use of ICT has an impact on learning process
- ICT accelerates learning process
- Teachers should use ICT during teaching
- Use of ICT improves grades
- Use of ICT for getting information is better than in the library

And the least influential factors include:

- Find it time consuming to use ICT in learning
- Know how to use ICT but not interested in using if for learning



1. Use of ICT has an impact on learning process
2. ICT accelerates learning process
3. Use of ICT improves grades
4. Teachers should use ICT during teaching
5. Feel fear from the use of ICT
6. Use of ICT for getting information is better than in the library
7. Know how to use ICT but not interested in using it for learning
8. Getting information from print material is better than using ICT
9. Cannot study without the use of ICT tools
10. Find it time consuming to use ICT in learning

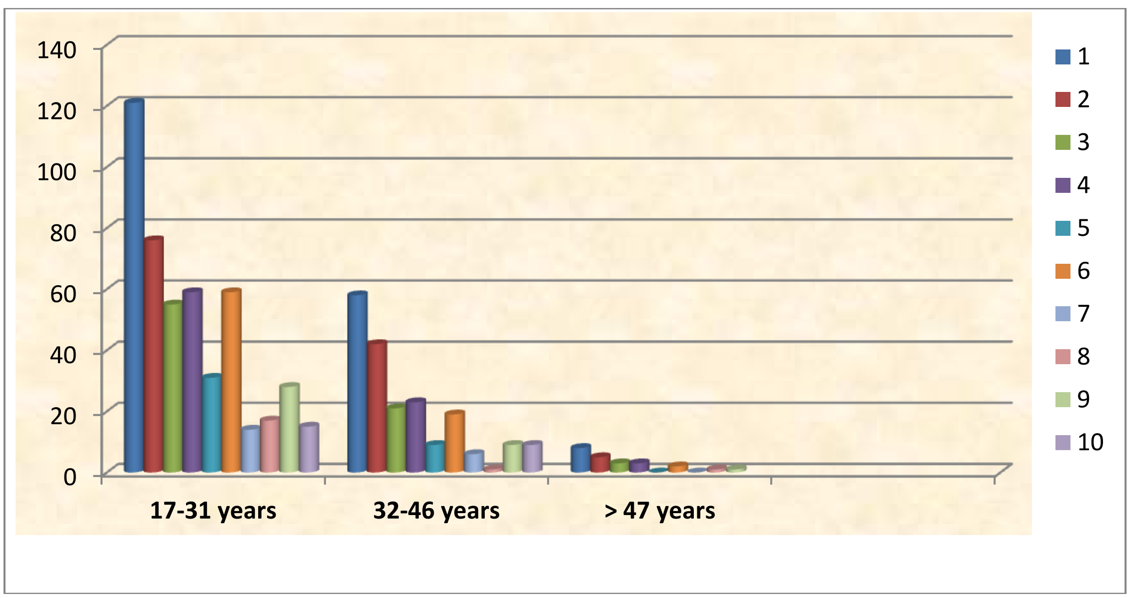
Fig 4.93: ICT Usage in Learning vs Option of Study

For the purpose of this section, the age groups were merged into three distinct categories – 17-31 years, 32-46 years and older than 47 years – as illustrated in the Fig 4.94.

It was observed that students of all age groups surveyed identified that the five most influential factors in their opinion about the usage of ICT in their learning were as follows:

- Use of ICT has an impact on learning process
- ICT accelerates learning process
- Teachers should use ICT during teaching
- Use of ICT for getting information is better than in the library
- Use of ICT improves grades

This is seen throughout the distribution of all age groups surveyed.



1. Use of ICT has an impact on learning process
2. ICT accelerates learning process
3. Use of ICT improves grades
4. Teachers should use ICT during teaching
5. Feel fear from the use of ICT
6. Use of ICT for getting information is better than in the library
7. Know how to use ICT but not interested in using it for learning
8. Getting information from print material is better than using ICT
9. Cannot study without the use of ICT tools
10. Find it time consuming to use ICT in learning

Fig 4.94: ICT Usage in Learning vs Age

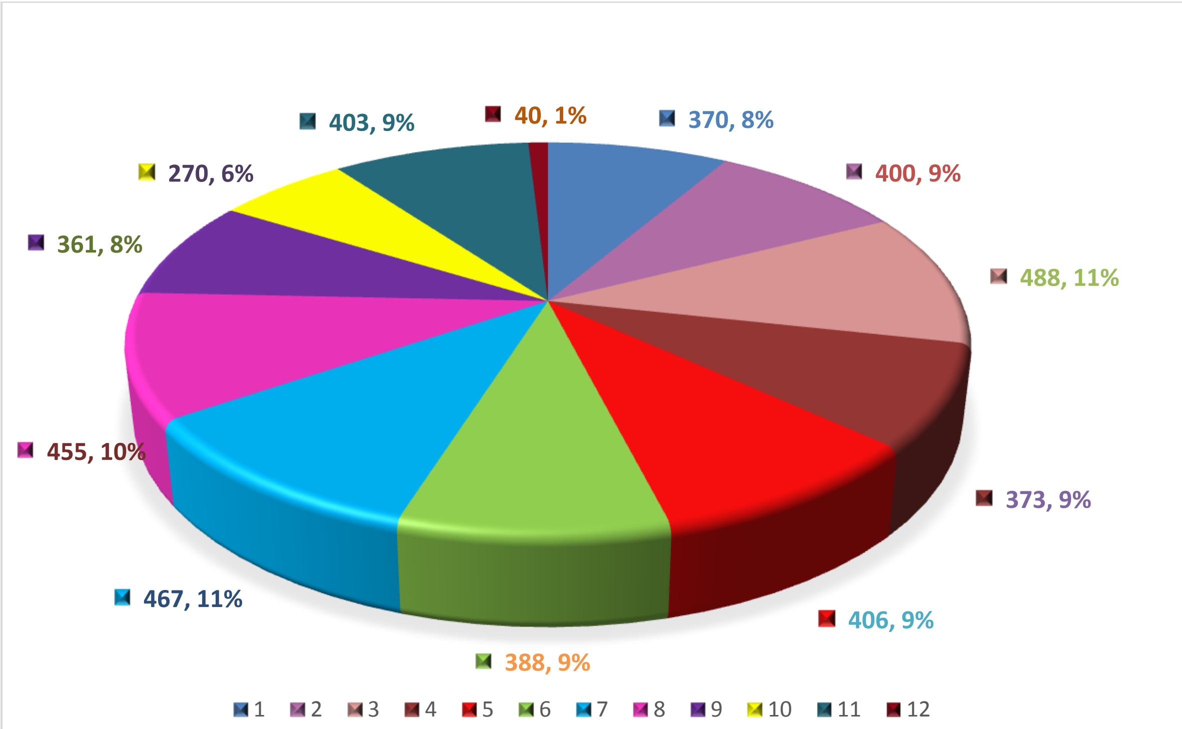
The least influential factors as identified by students of all age groups were:

- Know how to use ICT but not interested in using if for learning
- Cannot study without the use of ICT tools.

4.6.3 USES OF THE INTERNET

Strong IT skills are essential for success in the 21st century – for working within an increasingly (electronically) collaborative world, using computers and their growing number of applications, navigating electronic media and information effectively and continually adapting to changing technologies (ECAR 2008:49).

What are students actually doing on their computers and the internet? Fig 4.95 presents a number of activities that students are involved in on a daily basis. Studies have indicated that the use of email as well as word processing had become ubiquitous (ECAR 2008:46) as identified in this study as well.



1. Chatting	**7. Study Purpose**
2. Surfing	**8. Preparing Assignments**
3. Email	**9. Online Shopping**
4. Preparing Presentations	**10. Playing Games**
5. Literature Research	**11.Songs/Movies**
6. Social Media	**12.Other**

Fig 4.95: Uses of Internet

The top five uses of the Internet by students as displayed in Fig 4.95 are as follows:

- eMail
- Study purpose tied with Preparing Assignments
- Literature Review
- Songs/Movies tied with
- Surfing the Internet

While playing games was found at the bottom of the list.

4.6.3.1 AREA OF STUDY

		Area of Study		Total
		Business	**Information Technology**	
Uses of Internet	Chatting	200	170	370
	Surfing	214	186	400
	Email	288	200	488
	Preparing Presentations	236	137	373
	Literature Research	246	160	406
	Social Media	216	172	388
	Study Purpose	276	191	467
	Preparing Assignments	267	188	455
	Online Shopping	194	167	361
	Playing Games	139	131	270
	Songs/Movies	222	181	403
	Other	21	19	40
Total		**295**	**205**	**500**

Table 4.63: Uses of Internet vs Area of Study

For both Business Management and Information Technology students, the statistics as seen in Table 4.63 indicate that the top uses of the Internet are as follows:

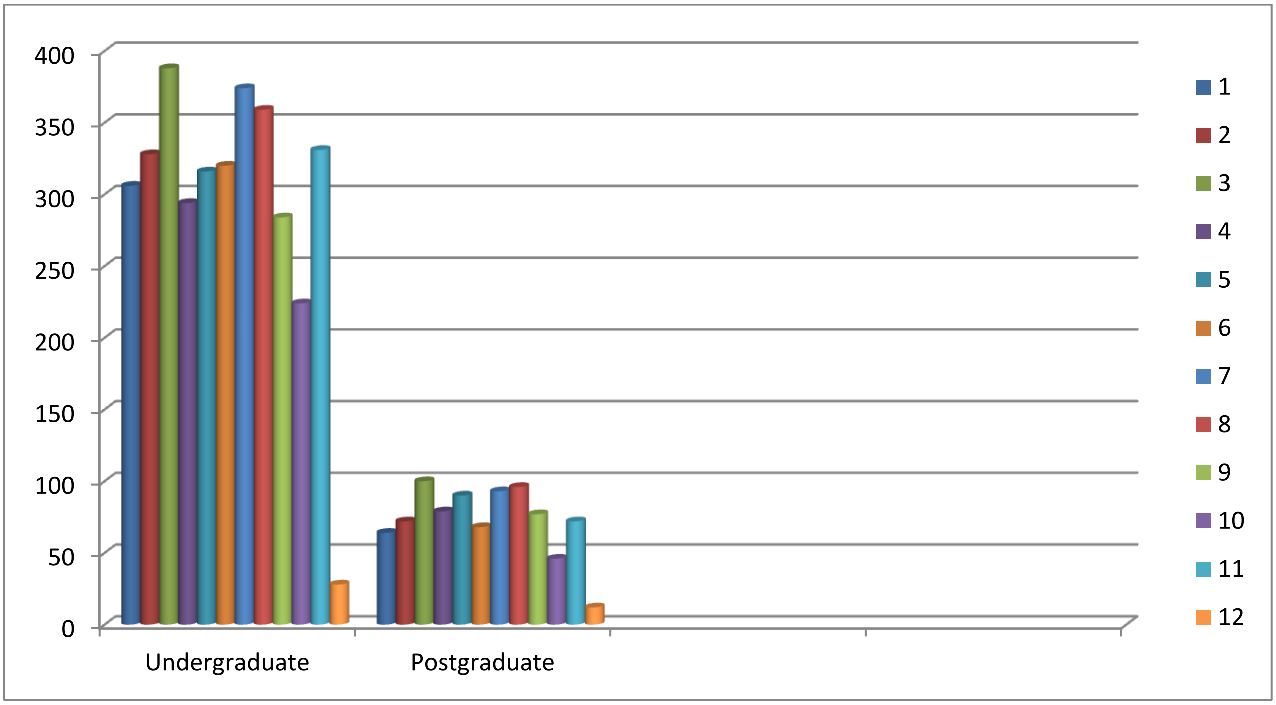
- eMail
- Study purpose
- Preparing Assignments

Listening to songs and watching movies were found midway in the list by both sets of students. Whilst, surfing the internet was at the top half of the list for Information Technology students it was at the bottom half of the list for the Business Management.

The Business Management students indicated that they used the Internet very often for the preparation of their presentation and for literature research. While these two uses were found at the tail end of the list for Information Technology students.

4.6.3.2 YEAR OF STUDY

For the purpose of this section, the years of study were merged into two distinct categories – undergraduate includes years 1, 2 and 3 and postgraduate includes MBA and MSc students.



1. Chatting	**7. Study Purpose**
2. Surfing	**8. Preparing Assignments**
3. Email	**9. Online Shopping**
4. Preparing Presentations	**10. Playing Games**
5. Literature Research	**11.Songs/Movies**
6. Social Media	**12.Other**

Fig 4.96: Uses of Internet vs Year of Study

Students studying at all levels both undergraduate and postgraduate also identified the top uses of the Internet are as follows:

- eMail
- Study purpose

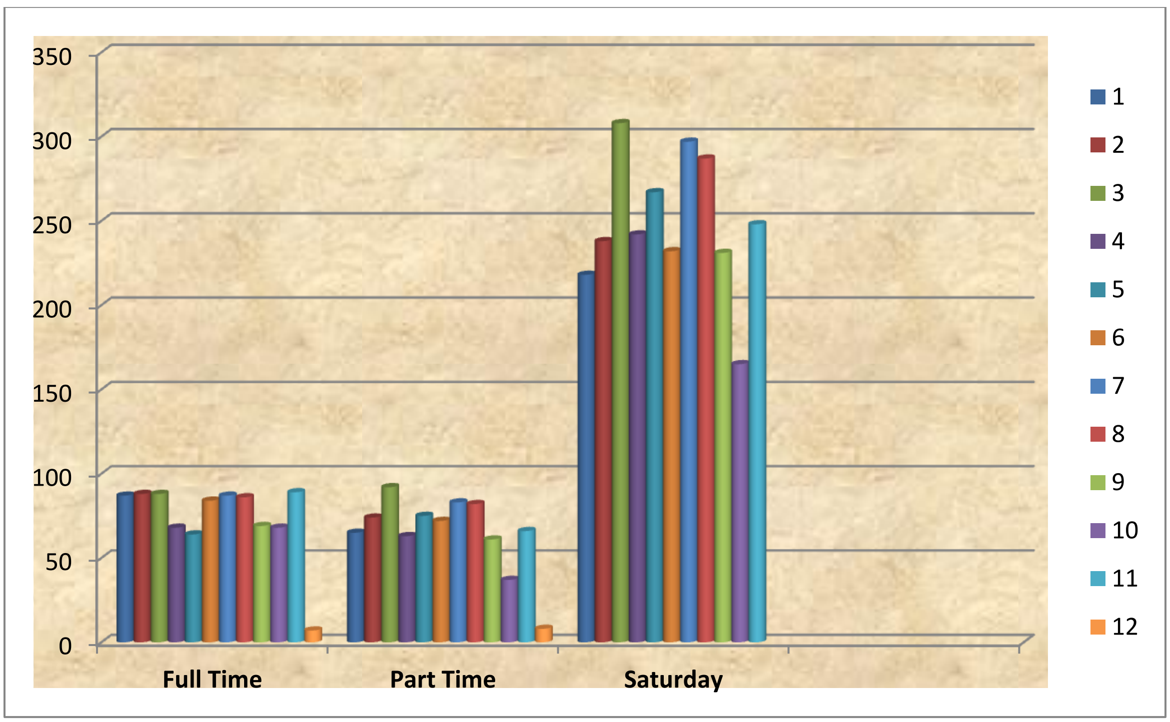
- Preparing Assignments

At the bottom of the list for both undergraduate and postgraduate students were:

- Playing games
- Chatting

The undergraduate students tended to use the internet for listening to songs and watching movies more frequently than the postgraduate students as shown in Fig 4.96.

4.6.3.3 OPTION OF STUDY



1. Chatting	7. Study Purpose
2. Surfing	8. Preparing Assignments
3. Email	9. Online Shopping
4. Preparing Presentations	10. Playing Games
5. Literature Research	11.Songs/Movies
6. Social Media	12.Other

Fig 4.97: Uses of Internet vs Option of Study

The responses from students studying full time indicated the top uses of the Internet are as follows:

- Songs/Movies
- eMail tied with study purpose
- Preparing Assignments
- Social Media
- Chatting tied with Surfing the internet

While the using the internet for literature research was at the bottom of the list for full time students.

For the students studying during part time option identified their top uses of the internet as:

- eMail
- Study Purpose
- Literature Research
- Preparing Assignments
- Surfing the internet

While the uses at the tail end of the list include Songs/movies, Social media, online shopping and playing games.

For the students studying during Saturday option identified their top uses of the internet as:

- eMail

- Study Purpose
- Preparing Assignments
- Literature Research
- Songs/Movies
- Preparing Presentations

The least use of the internet was seen as playing games.

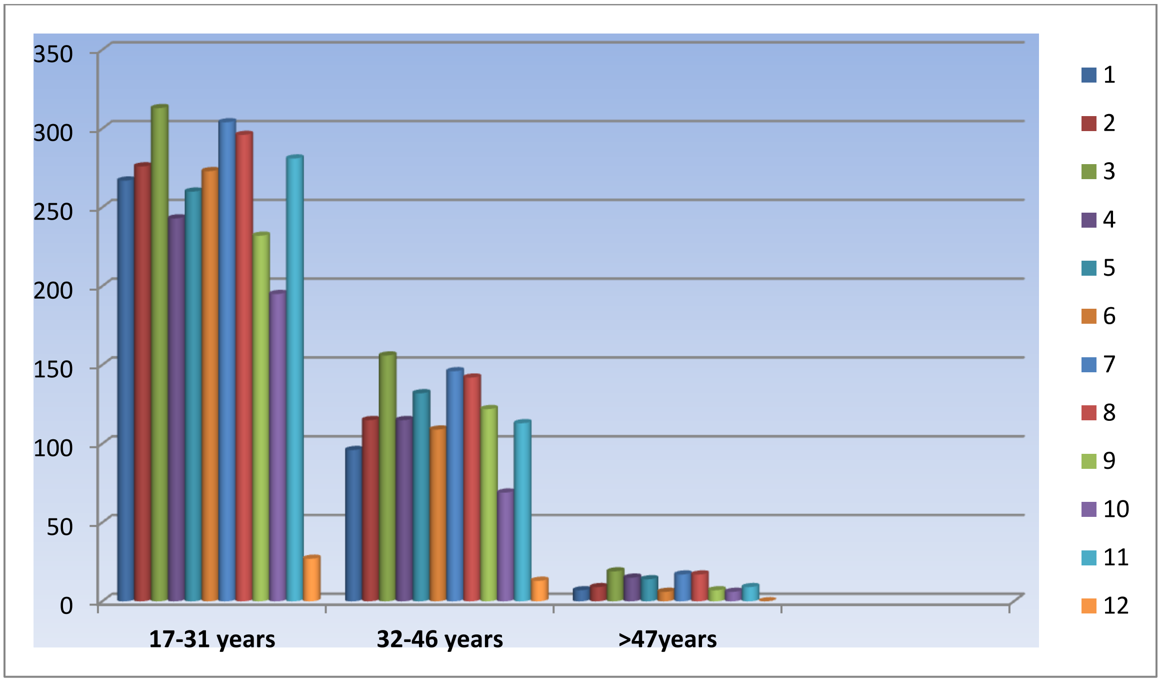
It should be noted that fulltime students spent more time chatting, emailing, surfing, watching movies/listening to songs as well as playing games than the part time and the Saturday students as shown in Fig 4.97.

4.6.3.4 AGE GROUP

For the purpose of this section, the age groups were merged into three distinct categories – 17-31 years, 32-46 years and older than 47 years – as illustrated in the Fig 4.98.

For students of all ages the top three uses of the internet were identified as follows:

- eMail
- Study Purpose
- Preparing Assignments



1. Chatting	**7. Study Purpose**
2. Surfing	**8. Preparing Assignments**
3. Email	**9. Online Shopping**
4. Preparing Presentations	**10. Playing Games**
5. Literature Research	**11.Songs/Movies**
6. Social Media	**12.Other**

Fig 4.98: Uses of Internet vs Age Group

Using the internet for research ranked lower for 17-31 years students while the students 32 and older ranked it higher (see Fig 4.98). All students identified playing games on the internet as very low on the list of uses.

Chatting was ranked at the bottom of the list for students between the ages of 32 to 46 years while students between 17 to 31 years and 47 years and older ranked it at 7th and 8th respectively. The younger students (17 -31 years) ranked listening to songs and watching movies in the higher listing of uses of the internet while the students older than 32 years ranked this use in the tail end of the listing. Social media as a use of internet way mid-way in the list for students in the age group 17-31 years whilst students older than 47 years indicated that social media was at the bottom of their list.

Students value the ways in which technology helps them achieve their academic goals and prepares them for their future academic and workplace activities as evidenced by the how students use the internet.

4.6.4 NUMBER OF HOURS SPENT IN DIFFERENT ONLINE INFORMATION ACTIVITIES

		Browsing	Scanning Journals	Reading Emails	Downloading Articles	Chatting with Friends
N	Valid	500	500	500	500	500
	Missing	0	0	0	0	0
Mean		**3.3520**	**2.2080**	**2.1660**	**2.3920**	**2.4800**
Median		**3.0000**	**2.0000**	**2.0000**	**2.0000**	**2.0000**
Std. Deviation		1.44092	1.25055	1.28598	1.37336	1.51068

	Responses	
	N	Percent
Browsing	35	5.3%
Scanning Journals	165	25.2%
Reading Emails	155	23.7%
Downloading Articles	137	20.9%
Chatting with Friends	163	24.9%

Table 4.64: Number of hours spent in different online information activities

Respondents vary on the number of hours spent each week doing online activities associated with school, work or recreation (see Table 4.64). The overall mean for browsing was 3.35 hours per week, with the mean for scanning journals and reading emails was 2.2 hours. The mean for downloading articles for academic purpose was 2.4 hours and the mean for chatting with friends was 2.48 hours per week. Differences based on age, option of study, year of study and area of study were minimal.

4.6.5 DATABASES USED FOR SEARCHING SUBJECT TOPICS

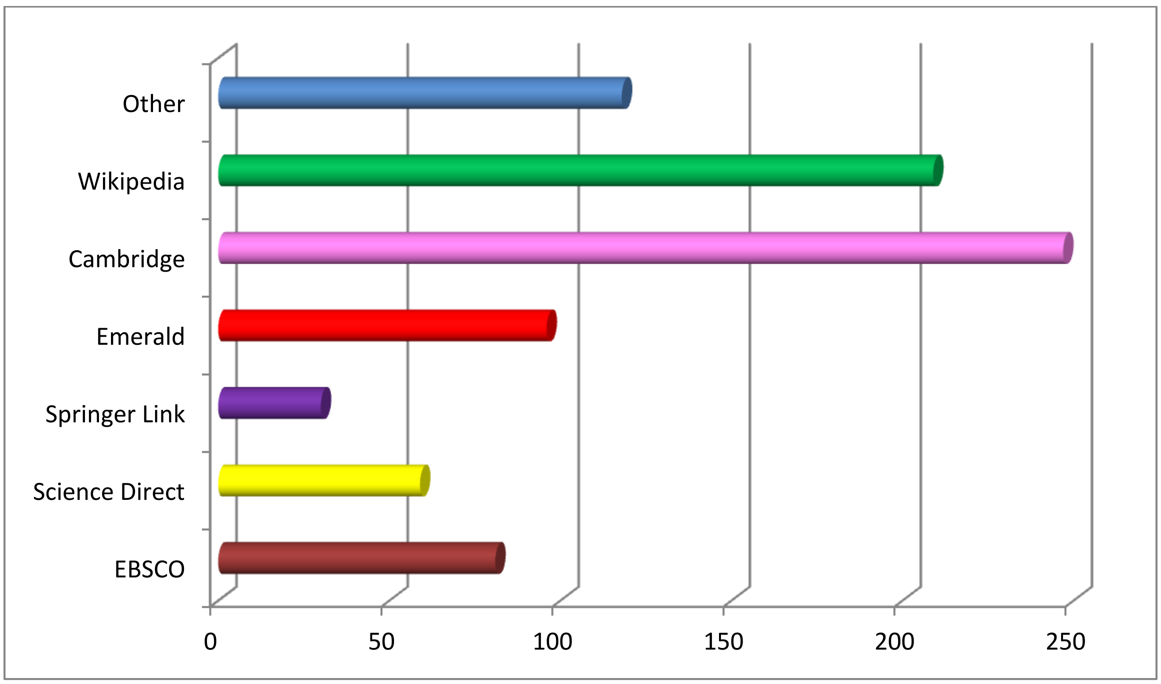


Fig 4.99: Databases used for searching

The response patterns were generally consistent across age group, area and year of study as well as option of study as illustrated in Fig 4.99. In response to the type of database students' use when searching subject topics, 25% of students indicated that they use Wikipedia. Follow up discussions with students, however, indicated that:

- *'We can't use Wikipedia as a source, but use it as a stepping – stone to other sources'.*
- *'Reliable sources are easy to find I've never heard anyone get a high grade when using Wikipedia as their source'*
- *'Lecturers drill it into you from year 1 not to copy and paste. They constantly explain the importance of referencing'.*

ECAR (2008) report also suggests that students use Wikipedia as a sounding board to other portals.

4.6.6 PROBLEMS FACED BY STUDENTS IN ACCESSING ERESOURCES

Studies by Breen et al. (2001) and Brotcorne (2005) have looked at students' computer and internet adoption from a university-wide perspective. Both of these studies found computer use to be a major element of the student's working day, but Breen et al. (2001) reported that students were sometimes discouraged from using ICT when in university due to access limitations and the cost of personal ownership of equipment.

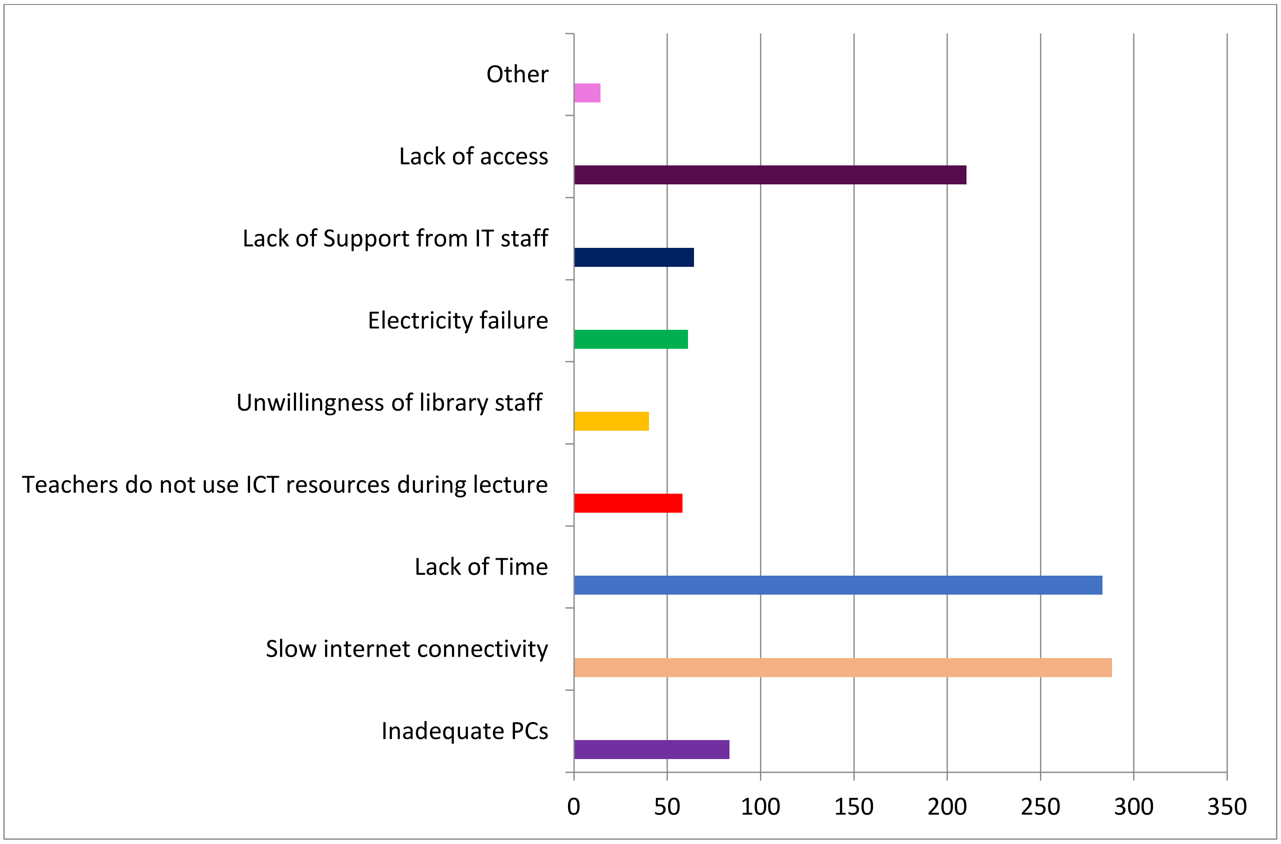


Fig 4.100: Problems faced in access of eResources

Generally, as seen in Fig 4.100, the major barriers to access of eResources have been identified as:

1. Slow internet connectivity
2. Lack of time
3. Lack of access

Whilst the factors at the bottom of the list include:

1. Lack of support from both the IT staff as well as Library staff
2. Teachers do not use ICT resources during their lecture.

Response patterns were consistent across the students surveyed irrespective of their age, area of study – whether Business Management or Information Technology, year of study (undergraduate or postgraduate) or option of study (whether they attend full time, part time or Saturday classes).

4.7 SECTION 5: STUDENTS PERCEPTION OF THE APPLICATION OF ICT IN TEACHING

This section deals with students' perception of the application of ICT in the teaching in the classroom as well as its impact on students' skills in learning.

4.7.1 CRITICAL SKILLS ENHANCED BY USE OF ICT

ICT opens up opportunities for learning because it enables learners to access, extend, transform and share ideas and information in multi-modal communication styles and format. It helps the learner to share learning resources and spaces, promote learner centred and collaborative learning principles and enhance critical thinking, creative thinking as well as problem solving skills (Majumdar (2006)).

The factors looked at in this questionnaire with regards to the enhancement of critical thinking by use of ICT were analyzing, discriminating, logical reasoning, transforming knowledge, applying standards, information seeking and predicting.

The following graph shows the overall general ranking of these factors.

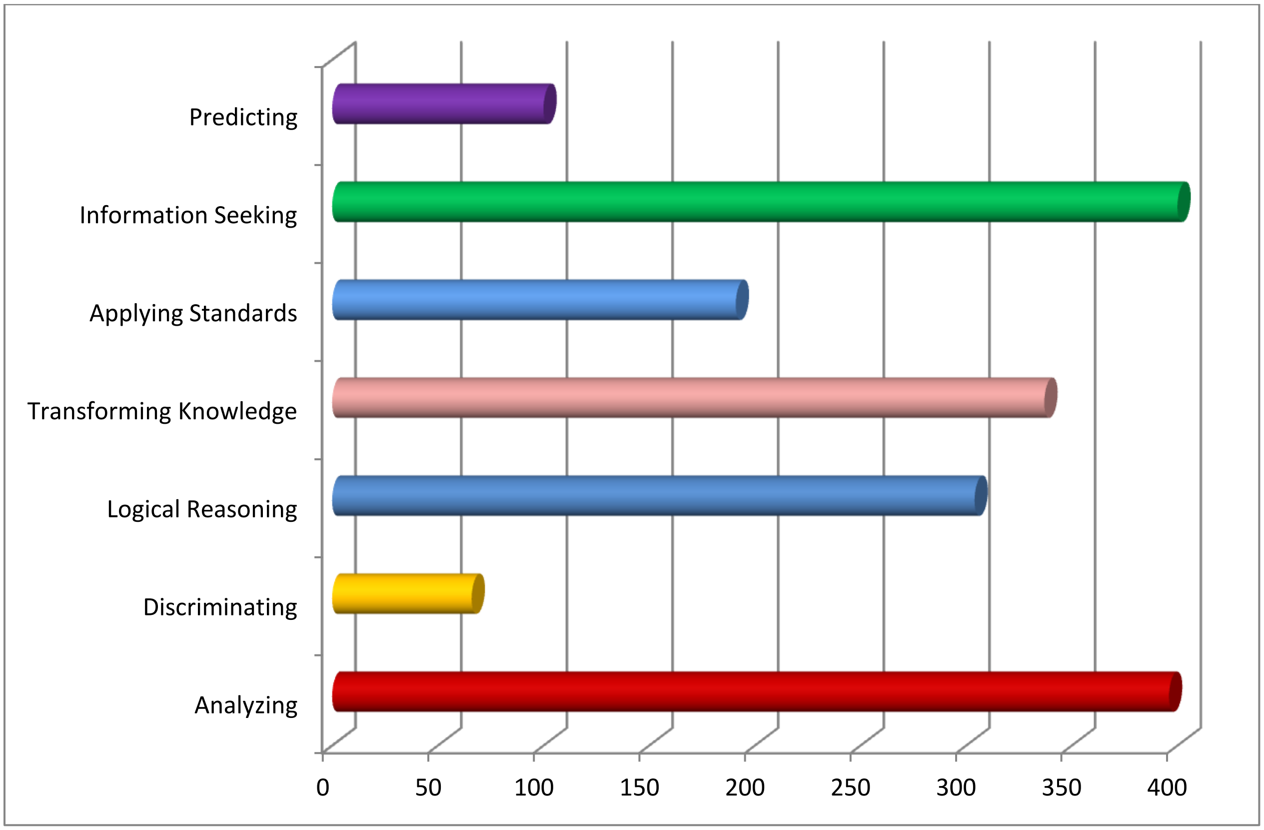
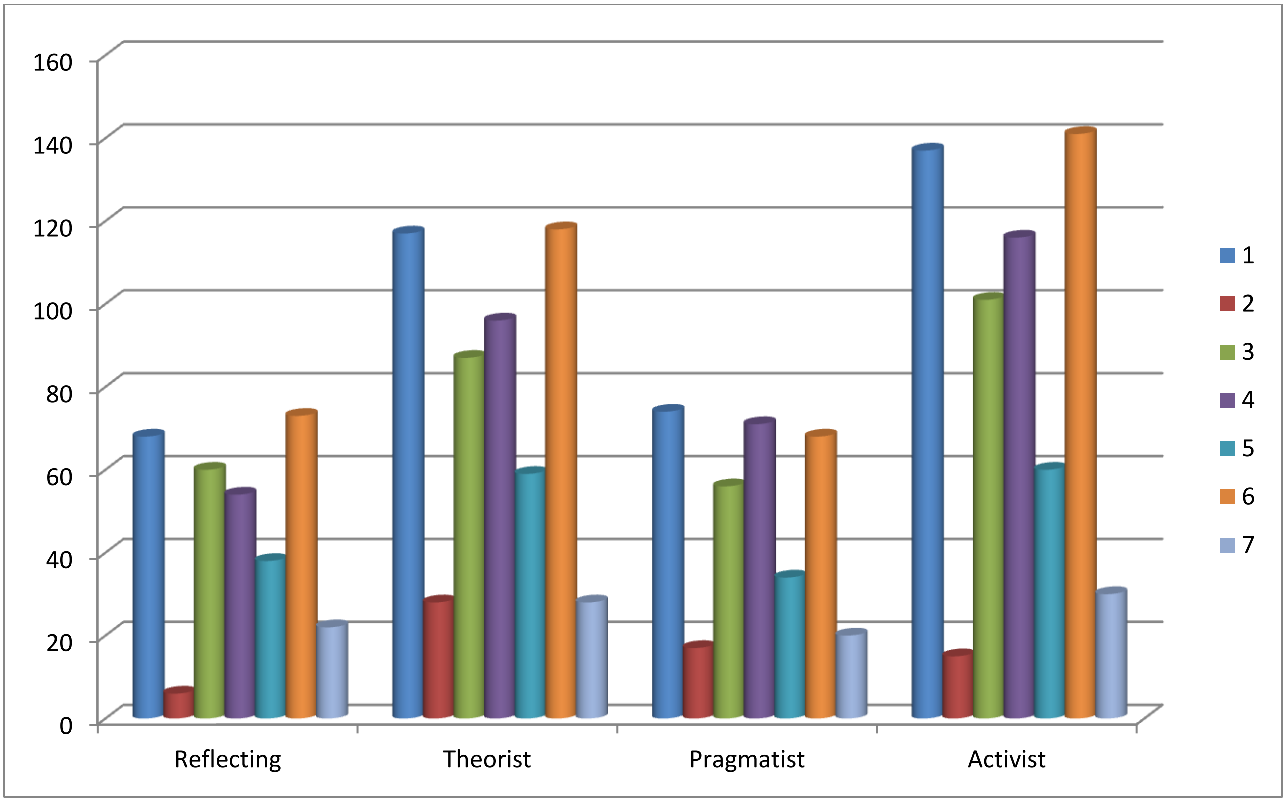


Fig 4.101: Enhanced Critical Thinking by use of ICT

From the general consensus of all students surveyed, it is seen that the top critical thinking skills that were identified that have been enhanced by the use of ICT (See Fig 4.101) include:

- Information Seeking 22%
- Analyzing 22%
- Transforming Knowledge 19%
- Logical Reasoning 17%

Whilst the critical skills that were thought to have been enhanced by the use of ICT the least were that of predicting (6%) and discriminating at 4%.



1. Analyzing	5. Applying Standards
2. Discriminating	6.Information Seeking
3. Logical Reasoning	7.Predicting
4. Transforming Knowledge	

Fig 4.102: Enhanced Critical Thinking by use of ICT and Learning Style

When the seven critical skills were cross tabulated against the type of learner which was previously identified in sections three and four, the top critical skills enhanced by the use of ICT emerged (see Fig 4.102) for all four types of learners to be:

- Information Seeking

- Analyzing
- Transforming Knowledge
- Logical Reasoning

While the least enhanced skills were identified as:

- Applying Standards
- Predicting
- Discriminating.

It should be noted that the response patterns of the critical skills that were enhanced by the use of ICT were also consistent across the students surveyed irrespective of their age, area of study – whether Business Management or Information Technology, year of study (undergraduate or postgraduate) or option of study (whether they attend full time, part time or Saturday classes).

4.7.2 STUDENTS' SKILLS ENHANCED BY ICT

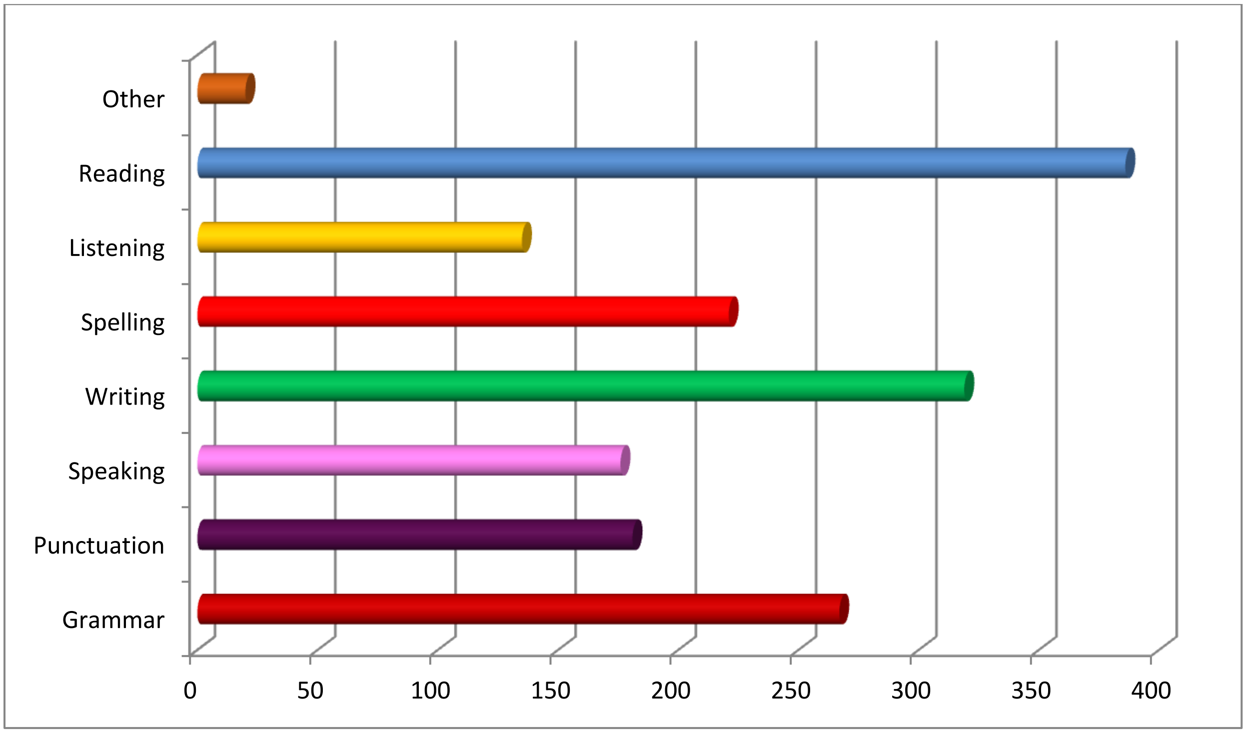


Fig 4.103: Students' Skills enhanced by use of ICT

The skills enhanced by ICT looked at in this section were grammar, punctuation, speaking, writing, spelling, listening and reading.

The skills that were most enhanced by ICT by the students were identified as illustrated in Fig 4.103:

- Reading 23%
- Writing 19%
- Grammar 16%
- Spelling 13%

While the least students' skills enhanced included were that of listening (8%), speaking (10%) and punctuation with 11%.

The area of study was cross tabulated with the students' skills enhanced by ICT and again the following table shows the ranking of the skills with respect to Business Management and Information Technology students.

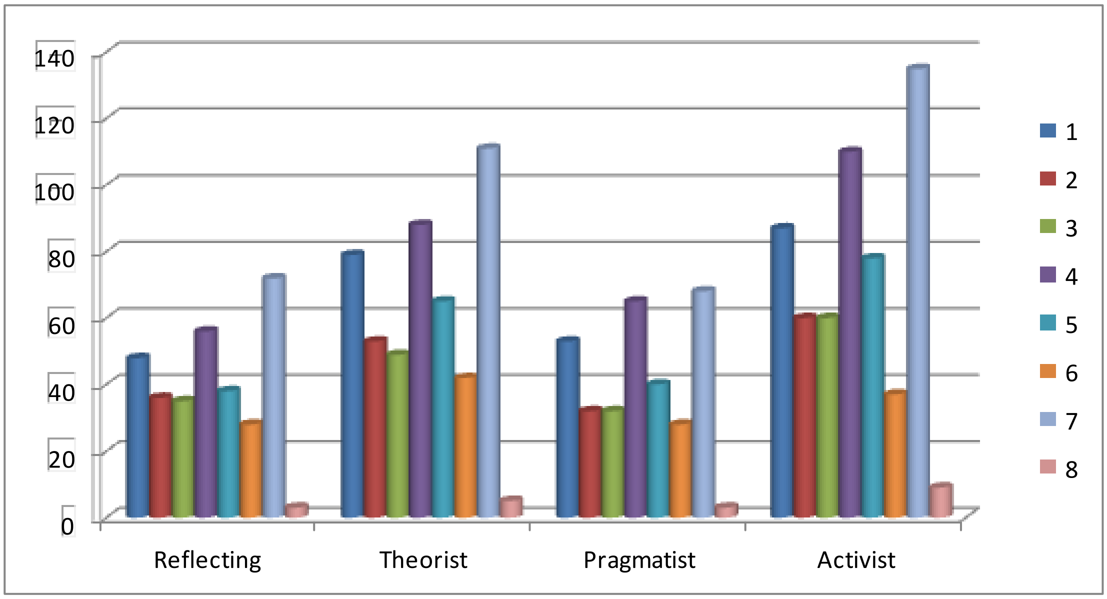
Business Management		***Information Technology***	
Reading	76%	Reading	78.5%
Writing	67%	Writing	60%
Grammar	60%	Grammar	43%
Spelling	48%	Spelling	40%

Table 4.65: Students' Skills most enhanced by use of ICT by Area of Study

And the least enhanced skills were as follows:

Business Management		***Information Technology***	
Listening	23%	Listening	33%
Speaking	34%	Speaking	37%
Punctuation	43%	Punctuation	26%

Table 4.66: Students' Skills least enhanced by use of ICT by Area of Study



1. **Grammar**	***5.*** **Spelling**
2. **Punctuation**	***6.*** **Listening**
3. **Speaking**	***7.*** **Reading**
4. **Writing**	***8.*** **Other**

Fig 4.104: Students' Skills enhanced by use of ICT and Learning Style

The enhancement of students' skills was cross tabulated against the type of learner that was identified previously as seen in Fig 4.104.

Regardless of the category of the learning style, the students found in the reflecting, theorist, pragmatist or activist category that the top skills that were enhanced by ICT were identified to include the following:

- Reading

- Writing
- Grammar
- Spelling

While at the bottom of the listing of skills included listening and speaking.

			Year of Study					Total
			Year 1	**Year 2**	**Year 3**	**MBA**	**MSc**	
Student skills	**Grammar**	Count	83	33	95	44	12	**267**
		%	53.5%	44.6%	55.6%	65.7%	36.4%	
	Punctuation	Count	56	22	65	27	11	**181**
		%	36.1%	29.7%	38.0%	40.3%	33.3%	
	Speaking	Count	54	19	65	28	10	**176**
		%	34.8%	25.7%	38.0%	41.8%	30.3%	
	Writing	Count	96	47	114	44	18	**319**
		%	61.9%	63.5%	66.7%	65.7%	54.5%	
	Spelling	Count	74	30	72	31	14	**221**
		%	47.7%	40.5%	42.1%	46.3%	42.4%	
	Listening	Count	42	25	40	14	14	**135**
		%	27.1%	33.8%	23.4%	20.9%	42.4%	
	Reading	Count	112	58	135	55	26	**386**
		%	72.3%	78.4%	78.9%	82.1%	78.8%	
	Other	Count	7	1	4	2	6	**20**
		%	4.5%	1.4%	2.3%	3.0%	18.2%	
Total		**Count**	**155**	**74**	**171**	**67**	**33**	**500**

Table 4.67: Students' Skills enhanced by use of ICT by Year of Study

The MSc students pursuing Information Technology course indicated that one of the skills that was enhanced by using ICT for them was that of listening (42%) see Table 4.67. This skill was seen at the tail end of list for all other students across age groups, area of study as well as option of study in contrast with the MSc students who identified it at the top of their list.

4.7.3 ICT HAS ENHANCED STUDENT PARTICIPATION AND FEEDBACK TO TEACHERS

It should be noted that the response patterns of the question *'if ICT has enhanced students' participation and feedback to teachers*' were consistent across the students surveyed irrespective of their age, area of study – whether Business Management or Information Technology, year of study (undergraduate or postgraduate) or option of study (whether they attend full time, part time or Saturday classes). The response indicated an overwhelming percentage (90%) agreed to the question that ICT has enhanced students' participation and feedback to their teachers whilst a 10% disagreed (see Fig 2.105).

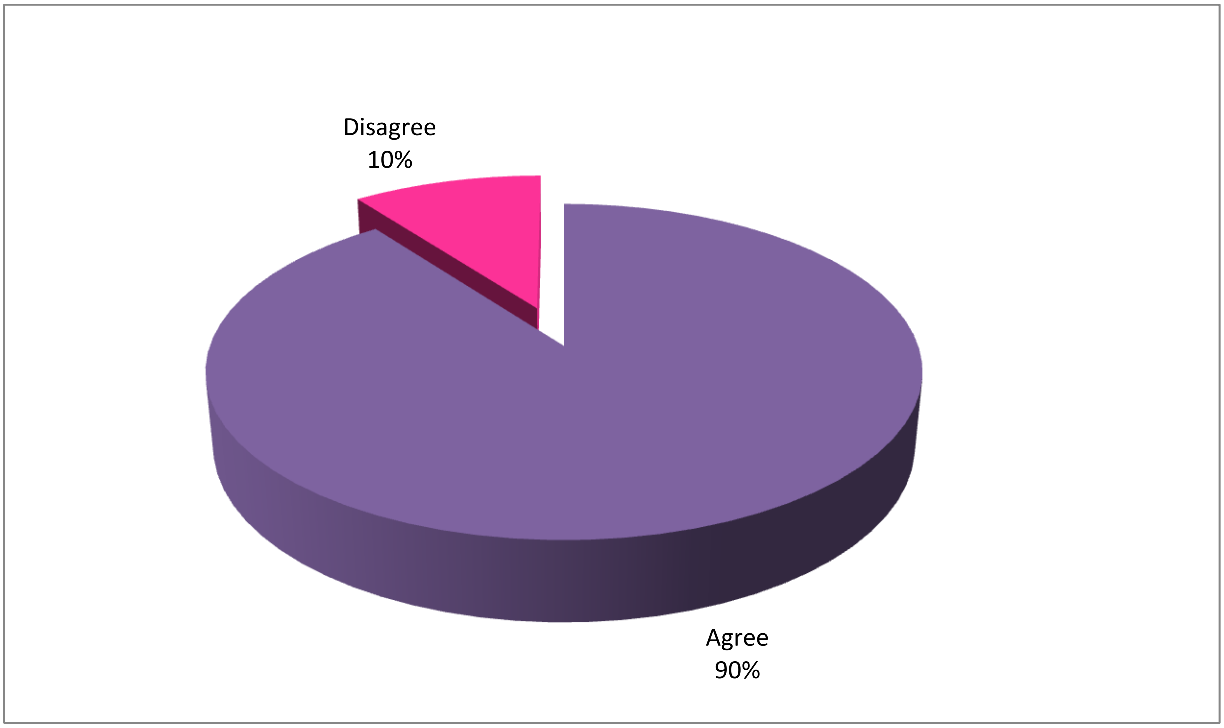


Fig 4.105: ICT has enhanced student participation and feedback to teachers

When this question was analyzed against the category of student learning style, it was also found that the majority of students belonging to all four categories of learning styles agreed that ICT did indeed enhanced participation and feedback to teachers from students. Again, only a small number of students disagreed as seen in the following chart- Fig 4.106.

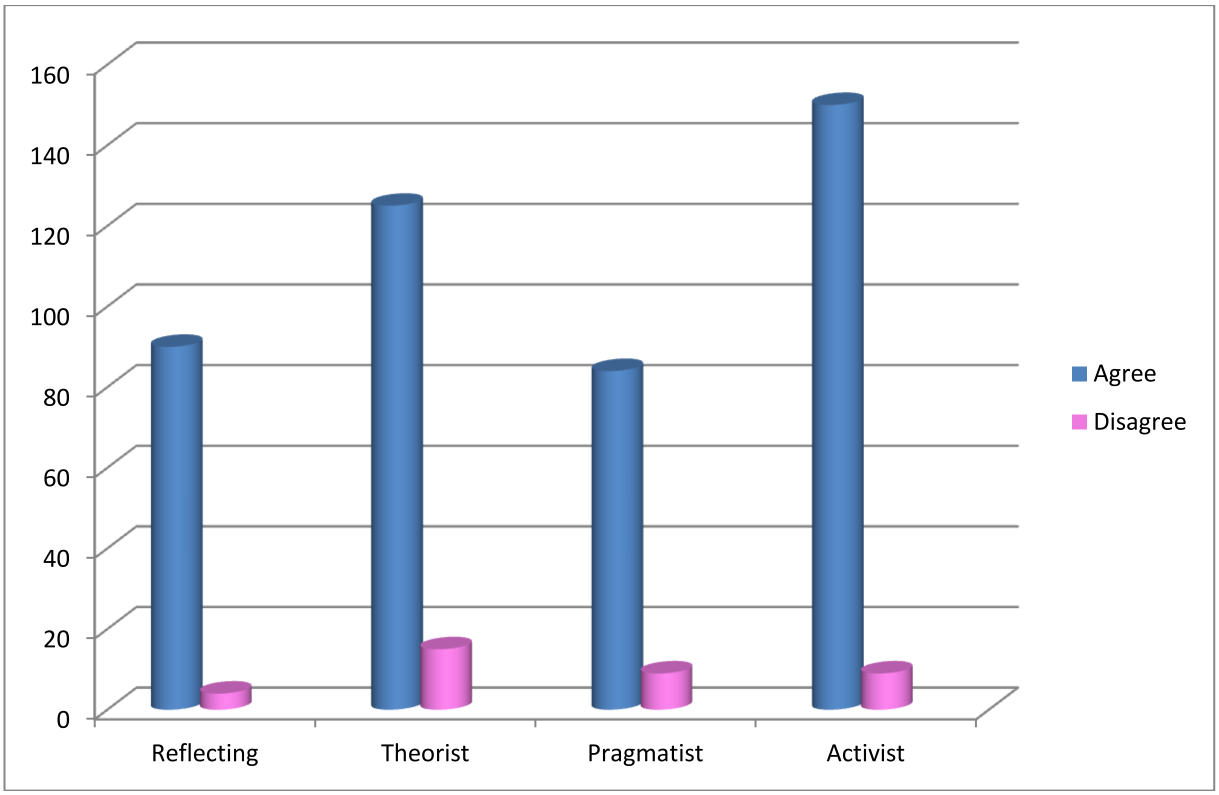


Fig 4.106: ICT has enhanced student participation and feedback to teachers by category of learner

4.7.4 ICT HAS ENHANCED COLLABORATION AMONGST STUDENTS

Collaboration amongst students is always important and the use of ICT has further enhanced this collaboration. An overwhelming 92% of the students surveyed agreed that it did indeed enhance their collaboration while a very small percentage disagreed.

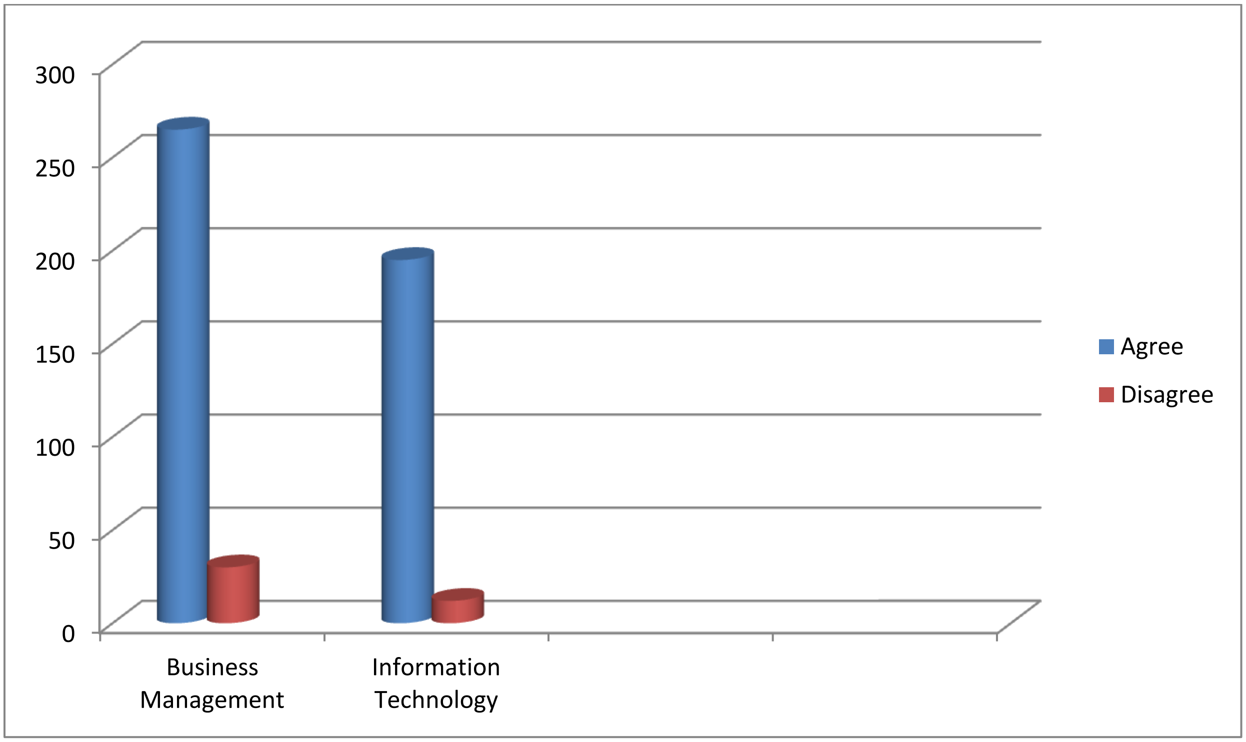


Fig 4.107: ICT has enhanced student collaboration by area of study

When this question – how has ICT enhanced collaboration amongst students - was analyzed in the area study as demonstrated in Fig 4.107 it was acknowledged that students studying both courses in Business Management and Information Technology agreed that ICT has in fact enhanced collaboration amongst students studying these courses whilst a very small percentage disagreed and this can be attributed to students not using form of technological tools.

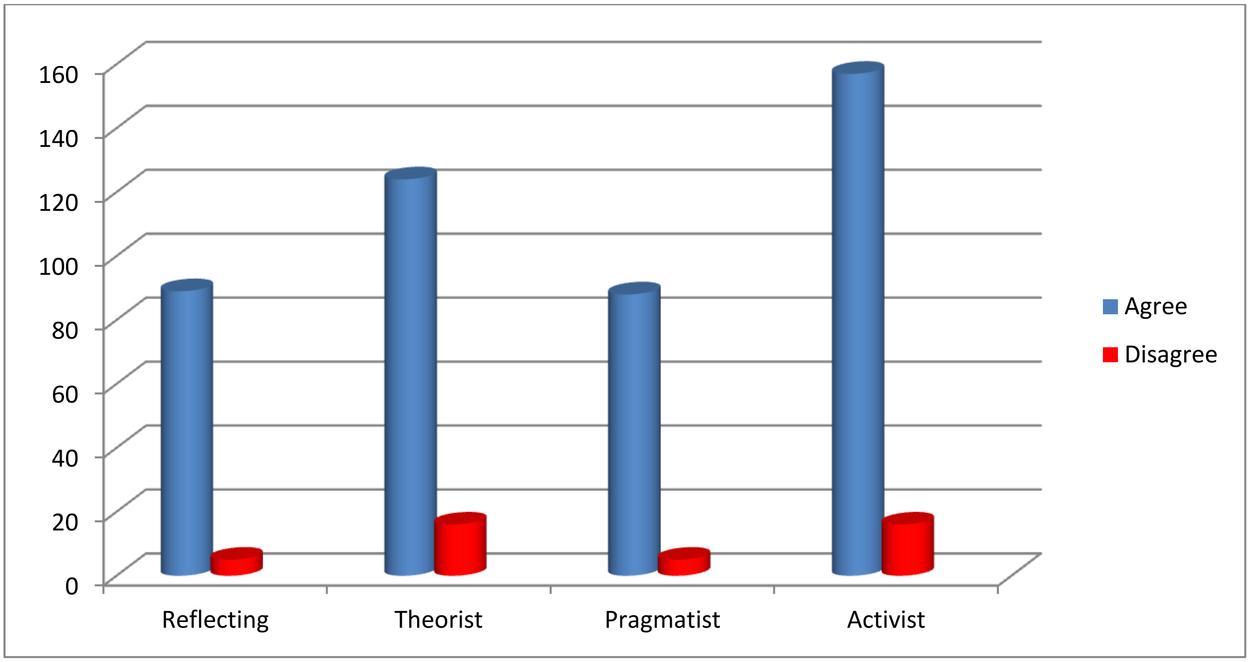


Fig 4.108: ICT has enhanced student collaboration by category of learning style

High percentages of students within all categories of the four learning styles, as seen in Fig 4.108, also agreed that the use of ICT has enhanced the collaboration amongst themselves for various learning activities. This pattern of response by students was also evident the both the undergraduate and postgraduate students. With only 5% of both the MBA and MSc disagree that ICT do not enhance their collaboration abilities (see Fig 4.109).

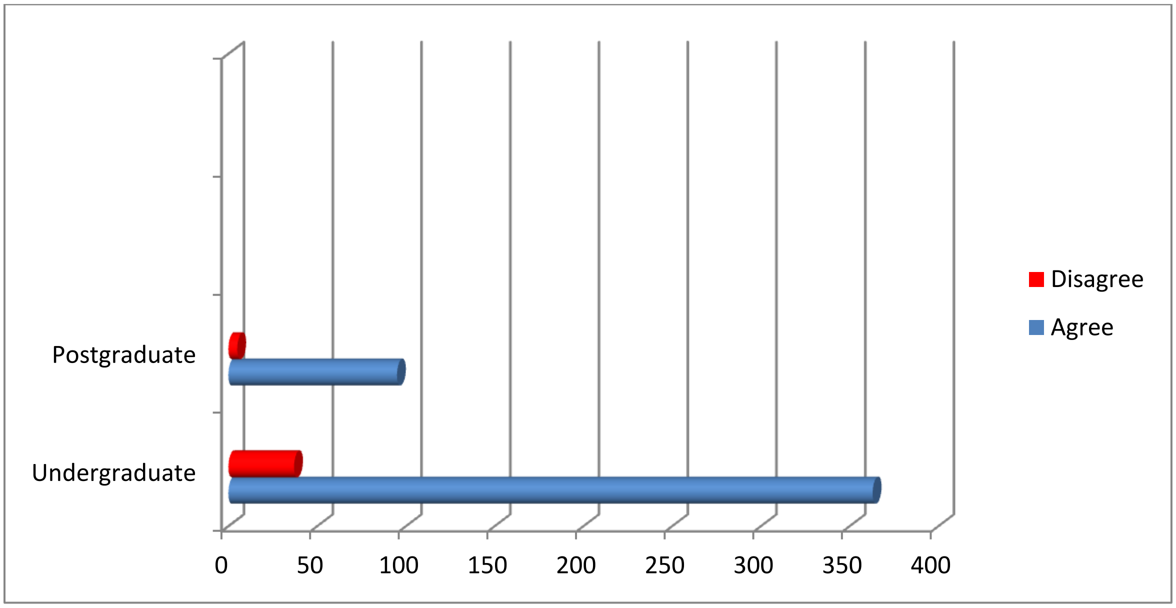


Fig 4.109: ICT has enhanced student collaboration by year of study

4.7.5 ICT CAN ENHANCE STUDENT AND TEACHER INTERACTION

The integration of ICT into teaching and learning always places pedagogy over technology. It is not the only concern to master ICT skills, but rather it involves using ICT to improve teaching and learning. The major emphasis of ICT infusion in pedagogy should be that it tends to improve learning, motivate and engage learners, promote collaboration, foster enquiry and exploration, and create a new learner centred learning culture. It permits the move from reproductive model of teaching and learning to an independent, autonomous learning model that promotes initiation, creativity and critical thinking with independent research. Learners are expected to collect, select, analyze, organize, extend, transform and present knowledge using ICT in an authentic and active learning paradigm. Teachers, on the other hand, are expected to create new, flexible and open learning environment with interactive, experiential and multimedia based delivery system. ICT should help teachers and learners to communicate and collaborate without boundaries, make learners autonomous and allow teachers to bring the whole world into classroom activities Majumdar (2006).

Students studying both courses in Business Management and Information Technology agreed that ICT can enhance the interaction between the teacher and student whilst a very small percentage disagreed (see Fig 4.110).

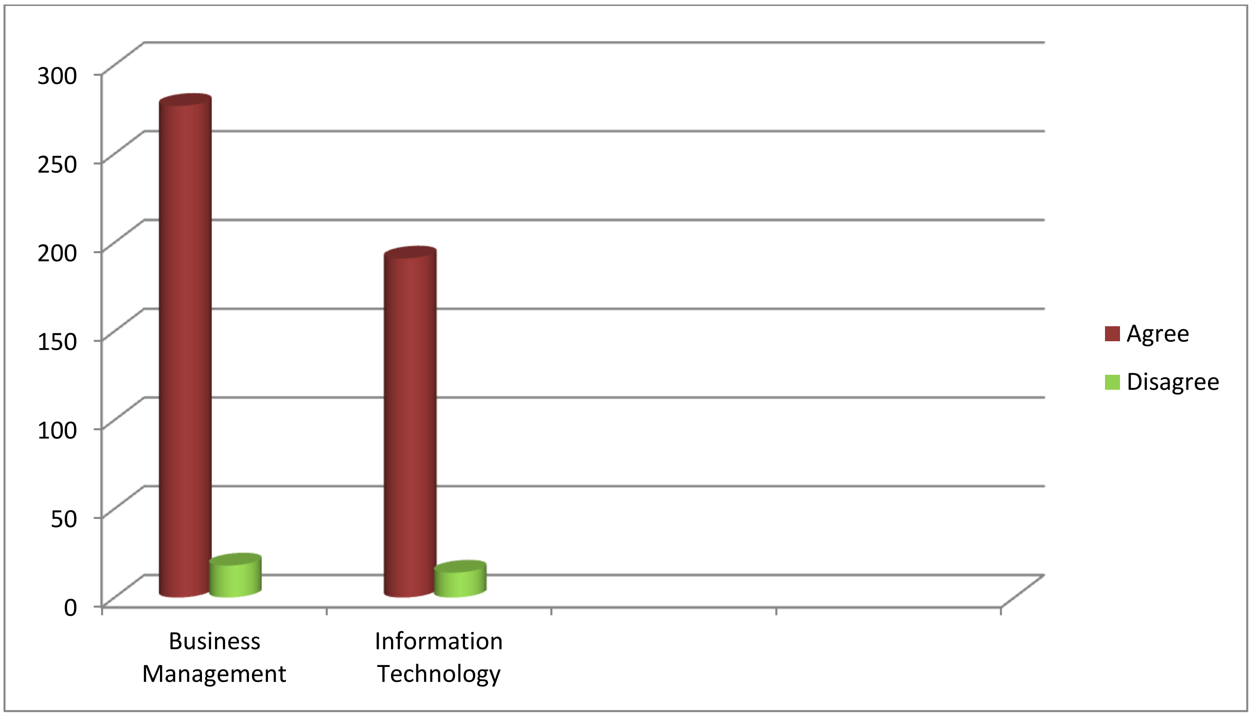


Figure 4.110: ICT can enhance teacher student interaction by area of study

It was also seen to be true for studying at both the undergraduate and postgraduate levels that the majority of these students (93%) agree that the interaction between student and teacher can be enhanced by the usage of ICT as illustrated in Fig 4.111.

This pattern of response by students was also evident according to the time option studying and the age group of the students.

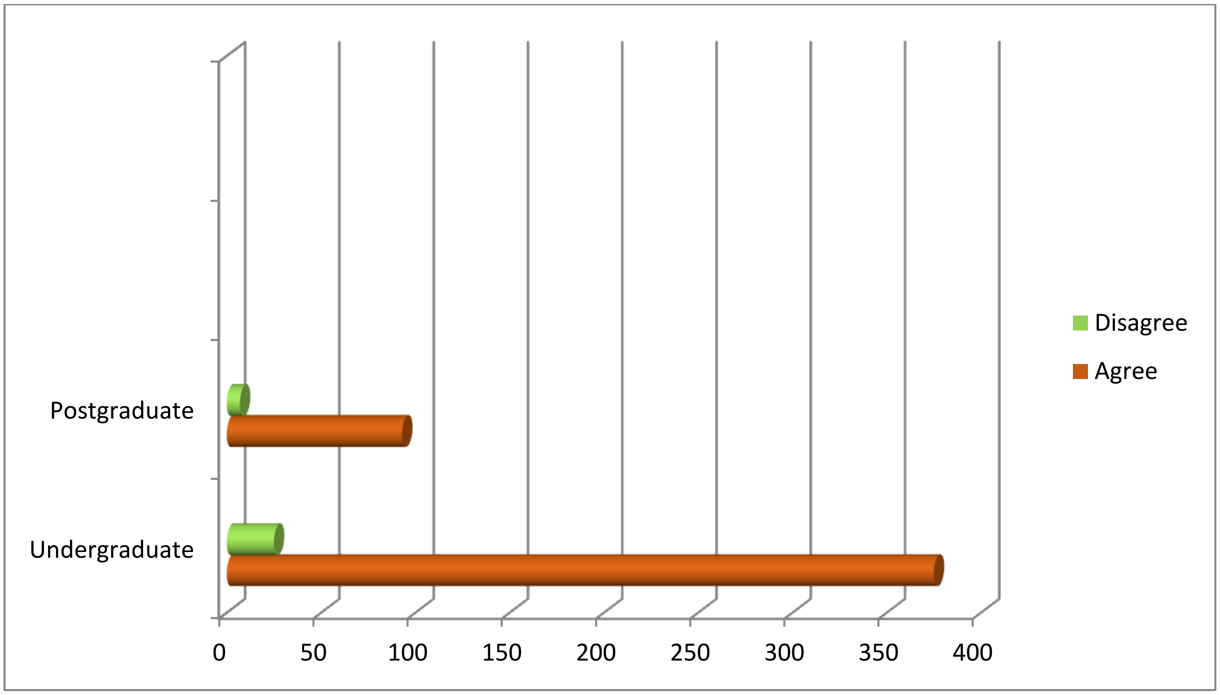


Fig 4.111: ICT can enhance teacher student interaction by year of study

When this question was analyzed against the category of student learning style, it was also found that the majority of students belonging to all four categories of learning styles – reflecting, theorist, pragmatist and the activist - agreed that ICT can enhance interaction between the teacher and student. Again, only a small number of students disagreed as seen in the following chart- Fig 4.112.

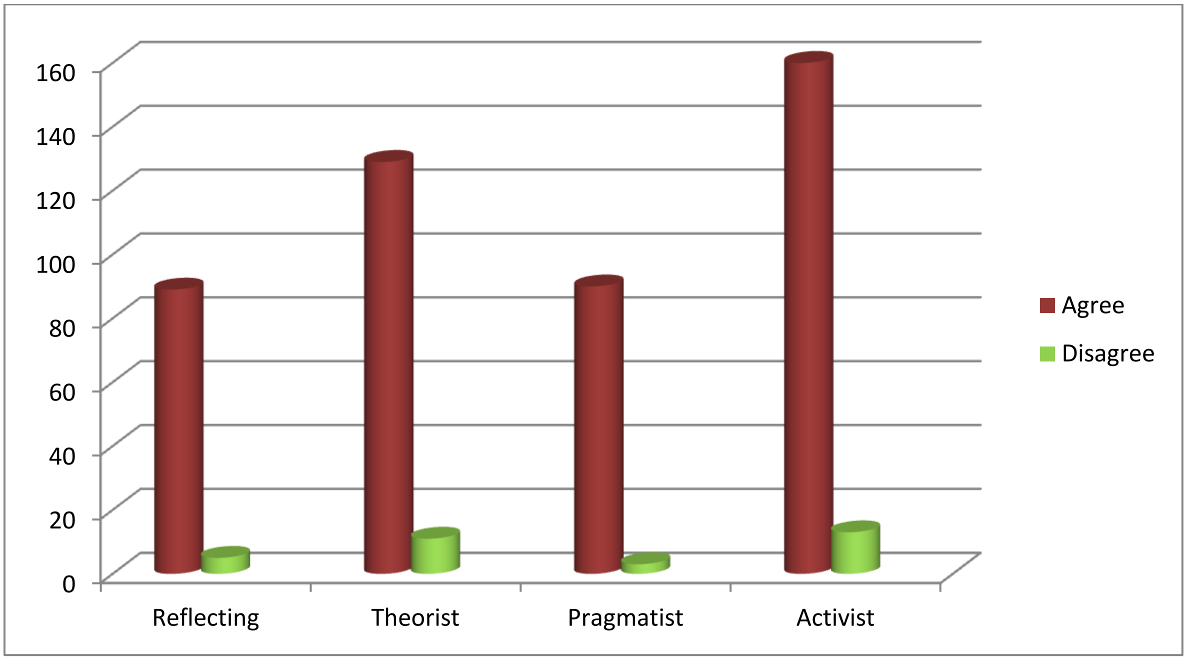


Fig 4.112: ICT can enhance teacher student interaction by category of learning

4.7.6 ICT TEND TO INCREASE STUDENTS' LEARNING MOTIVATION

94% of the students surveyed agreed that ICT tend to increase students' learning motivation while the remaining 6% disagreed. Students studying both courses in 92.5% of the Business Management students and 96% of the students studying Information Technology courses agreed that ICT tend to increase students' learning motivation whilst a very small percentage disagreed. 95% of the students studying at the undergraduate level (years 1, 2 and 3) and 91% of students at the postgraduate level agreed to the question asked (see Table 4.68).

	Agree		Disagree	
Undergraduate	**379**	**95%**	**21**	**5%**
Postgraduate	**91**	**96%**	**9**	**4%**

Table 4.68: ICT tend to increase students' learning motivation by year of study

Students studying at the three time options also agreed that the usage of ICT tends to increase their motivation to learn with very high percentages of 95, 91 and 94 during full time, part time and Saturday options respectively. Very small percentages disagreed with the question as displayed in Fig 4.113 below.

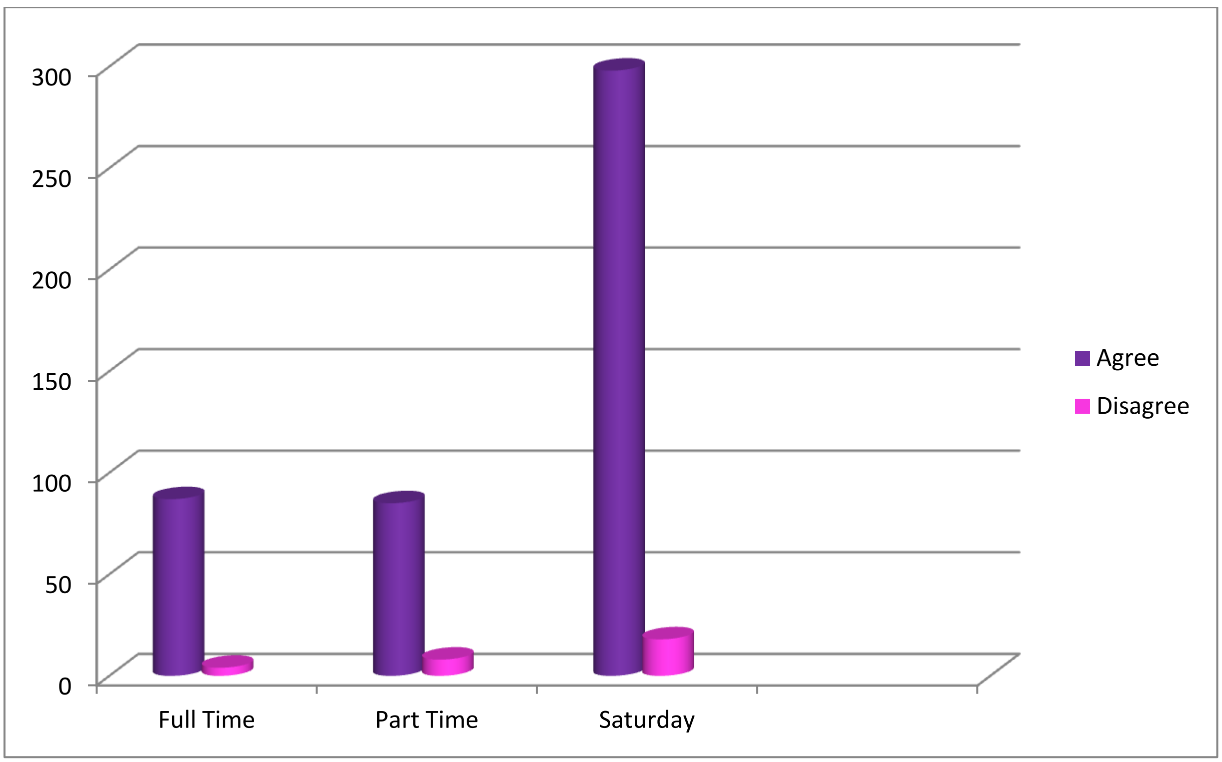


Fig 4.113: ICT tend to increase students motivation by option of study

For the purpose of this question, the age groups were merged into three distinct categories – 17-31 years, 32-46 years and older than 47 years – as illustrated in the

Table 4.69. Students across all age groups were inclined to agree that with the usage of ICT they were motivated to learn as illustrated in the table below.

Age Group	**Agree**		**Disagree**	
17-31 years	**304**	**94%**	**18**	**6%**
32-46 years	**147**	**93%**	**11**	**7%**
>47 years	**19**	**95%**	**1**	**5%**

Table 4.69: ICT tend to increase students motivation by age

When this question was analyzed against the category of student learning style, it was also found that the majority of students belonging to all four categories of learning styles – reflecting, theorist, pragmatist and the activist - agreed that ICT that with the usage of ICT they were motivated to learn. Again, only a small number of students disagreed as seen in the following chart- Fig 4.114.

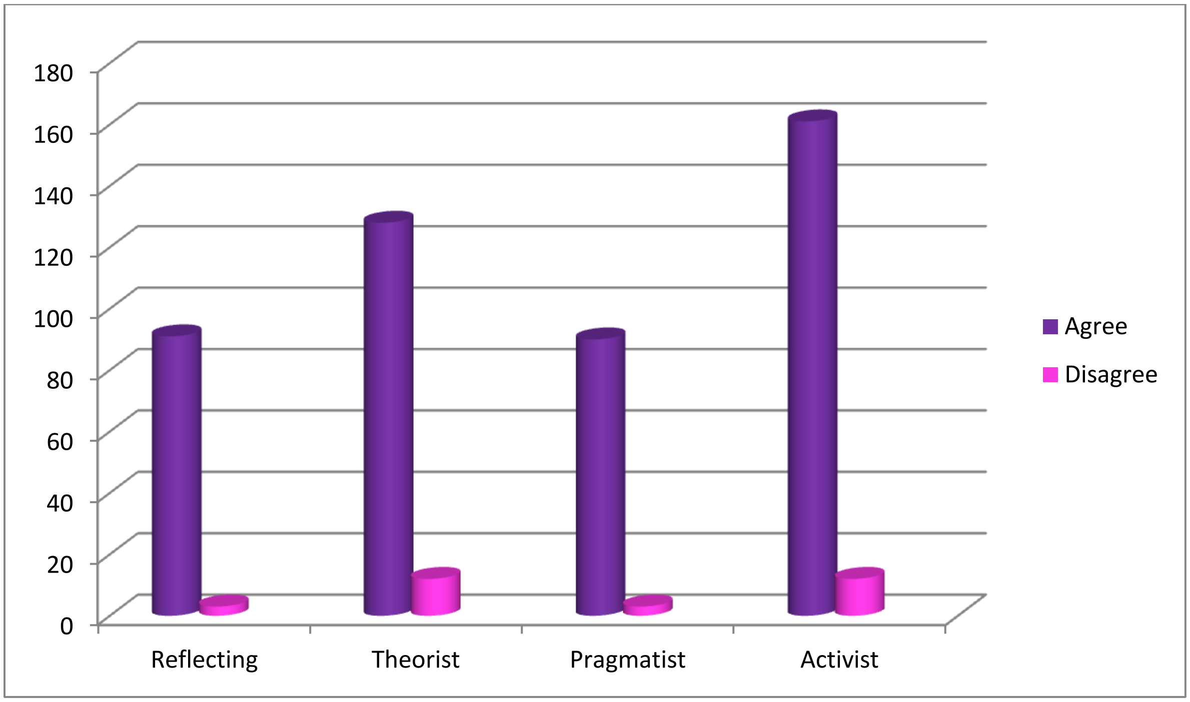


Fig 4.114: ICT tend to increase students motivation by category of learning

Research conducted at Lancaster University in 2004 entitled *'The Motivational Effect of ICT on Pupils'* stated that school teachers indicated that they felt that ICT had a positive impact upon students' interest in and attitudes towards school work. The teachers reported that they felt that ICT was helping students to access their work more, to research more, to bring the mundane to life, and to bring interaction to their work. Teachers also believed that ICT helped students to take pride in their work, that it was helpful for coursework, that students were taking a genuine interest in the quality of their work, and that it was more likely that a task would be completed and handed in on time. Some teachers indicated that students could fulfill a task and complete it effectively without the teacher having to go over and over it with them (Passey et al, 2004).

4.7.7 STUDENT PERCEPTION OF TEACHERS' SKILLS IN ICT

It is to be noted that for the following questions that the total number of responses is larger than the overall number of respondents (N=500) due to the respondents choosing more than one responses listed as deemed applicable to the question.

Strong IT skills are essential for success in the 21st century – for working within an increasingly electronic collaborative world, using computers and their growing number of applications in use, navigating electronic media and information effectively as well as continually adapting to the ever changing technologies. This should be evident in teachers but more importantly in the students' perception of their teachers' skills in ICT especially in the classroom.

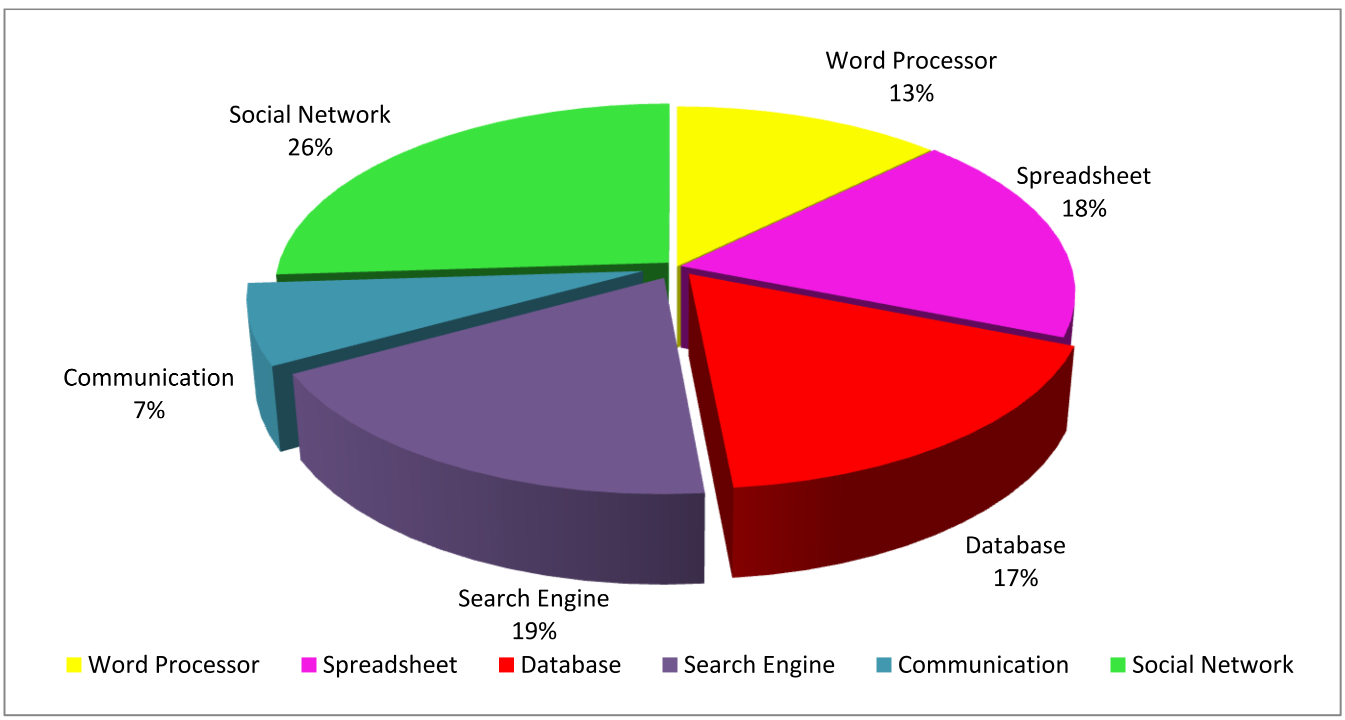


Fig 4.115: Teachers' perceived skills in ICT

From the survey conducted it was seen that students perceive that teachers use social network (26%) the most and communication in the least with 7% from the various options of word processor, spreadsheet, database, search engine , communication and social network as illustrated in Fig 4.115.

When the data was analyzed according to the two areas of study – Business Management and Information Technology, it was observed that both areas identified that the social networks was the perceived number one ICT skill demonstrated by teachers with over 80%. Whilst the communication skill was found at the bottom of the list with approximately 20% of the students surveyed for both areas of study. Surprisingly, the ICT skills of Search engine, database, spreadsheet and word processor fared better in the area of Business Management than that of the Information Technology area of study seen in the following bar chart – Fig 4.116

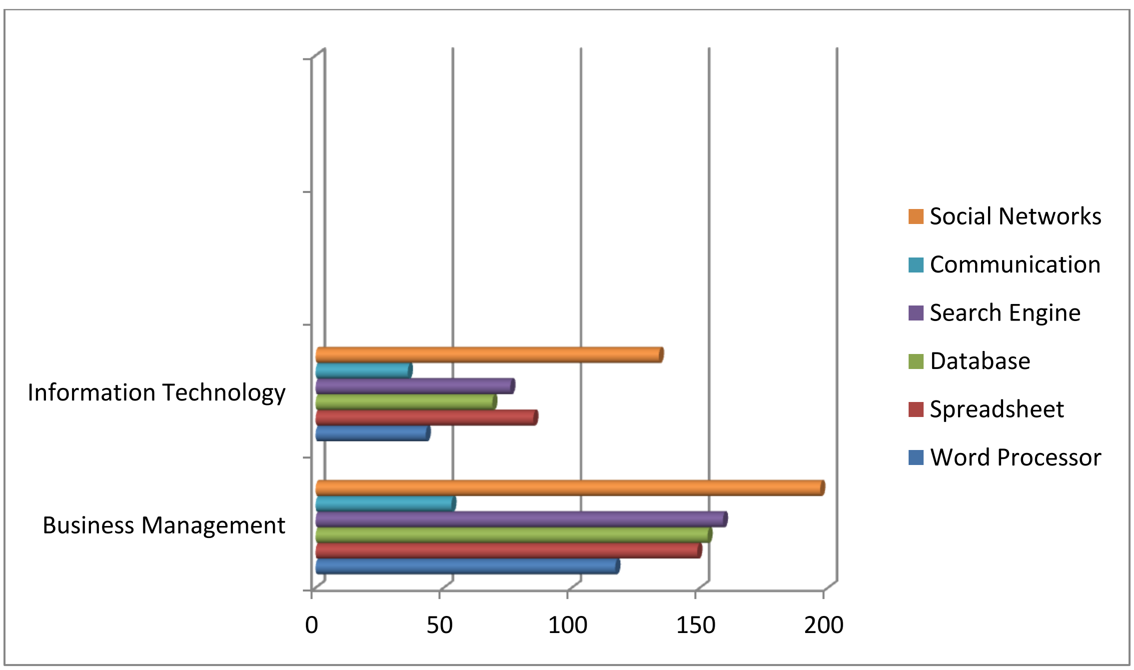


Fig 4.116: Teachers' perceived skills in ICT by Area of Study

It was also seen to be true for studying at both the undergraduate and postgraduate levels that the majority of these students identified that the social networks was the perceived number one ICT skill demonstrated by teachers, whilst the communication skill was found at the bottom of the list , see Fig 4.117. This pattern of response by students was also evident according to the time option studying and the age group of the students.

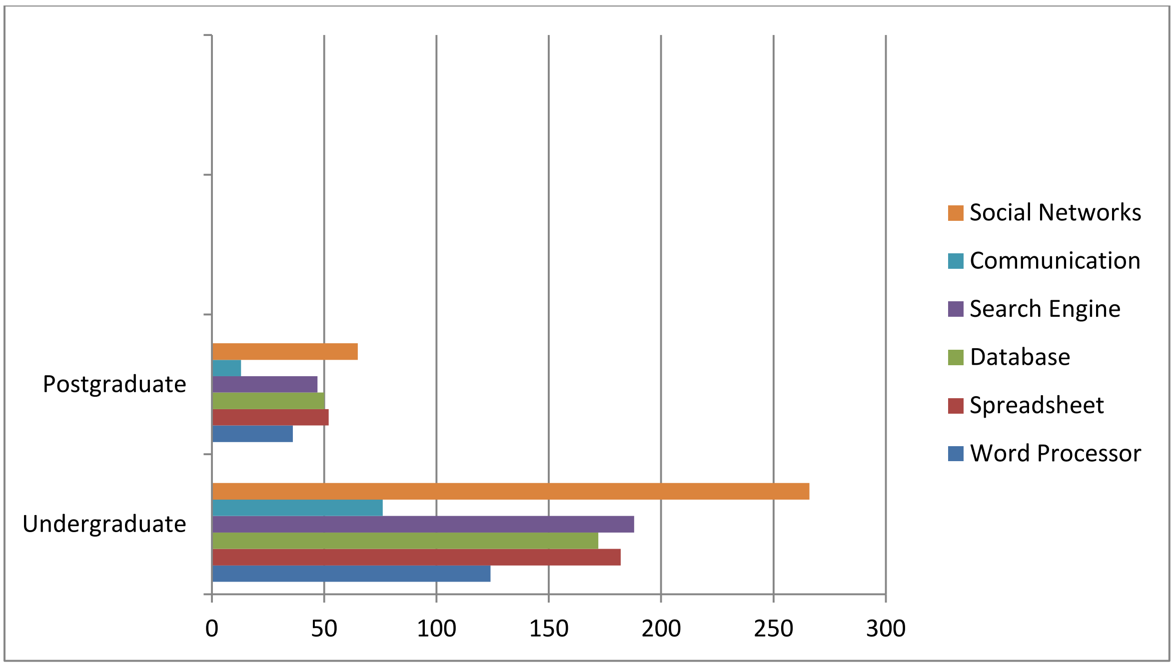


Fig 4.117: Teachers' perceived skills in ICT Year of Study

When the students' perception of their teachers' skills in ICT was analyzed against the category of student learning style – reflecting, theorist, pragmatist and activist the results tallied showed conflicting perception of ICT skills demonstrated by teachers in the previous discussion (by area of study, year of study, age group and option of study) as seen in the following chart- Fig 4.118. Social network was at the bottom of the ladder and communication was seen as number 2. The listing of the ICT skills by teachers is as follows as identified by the four distinct learning categories:

1. Word Processor
2. Communication
3. Database
4. Spreadsheet
5. Search Engine
6. Social Network

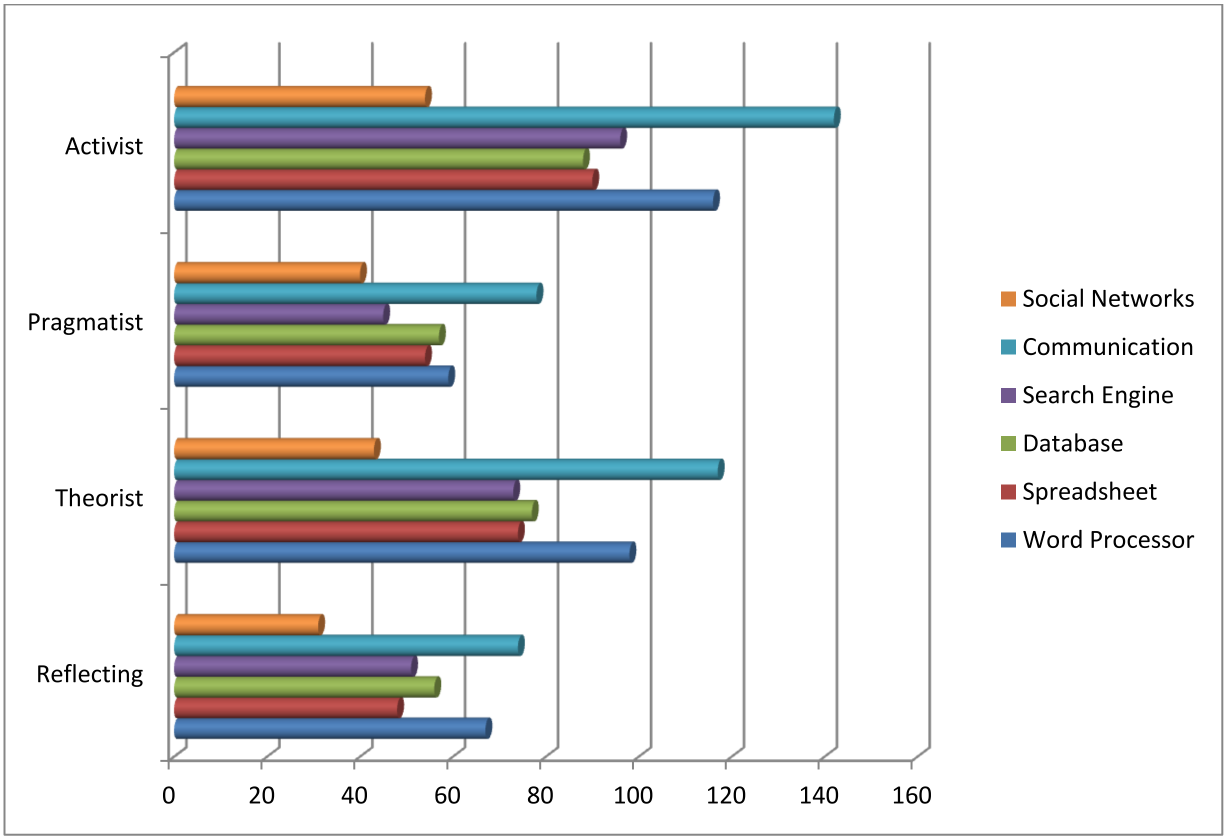


Fig 4.118: Teachers' perceived skills in ICT by Student Category of Learning

What do Students Say about Their Instructors' Use of Technology?

52% say most/all of their instructors provide adequate technology training

66% say most/all of their instructors have adequate technical skills

67% say most/all of their instructors use technology effectively

67% say most/all of their instructors use the right kinds of technology

Students who are positive about their own technology use and experiences are more likely to say their instructors have adequate technology skills

(ECAR Study of Undergraduate Students and Information Technology, 2013:11)

While students' perception of teachers' skills in ICT included the options of word processor, spreadsheet, database, search engine, communication and social network, the hardware utilized in the classroom included computer (laptop),smart phone and multimedia. The pie chart in Fig 4.119 gives the distribution of the hardware used in the classroom.

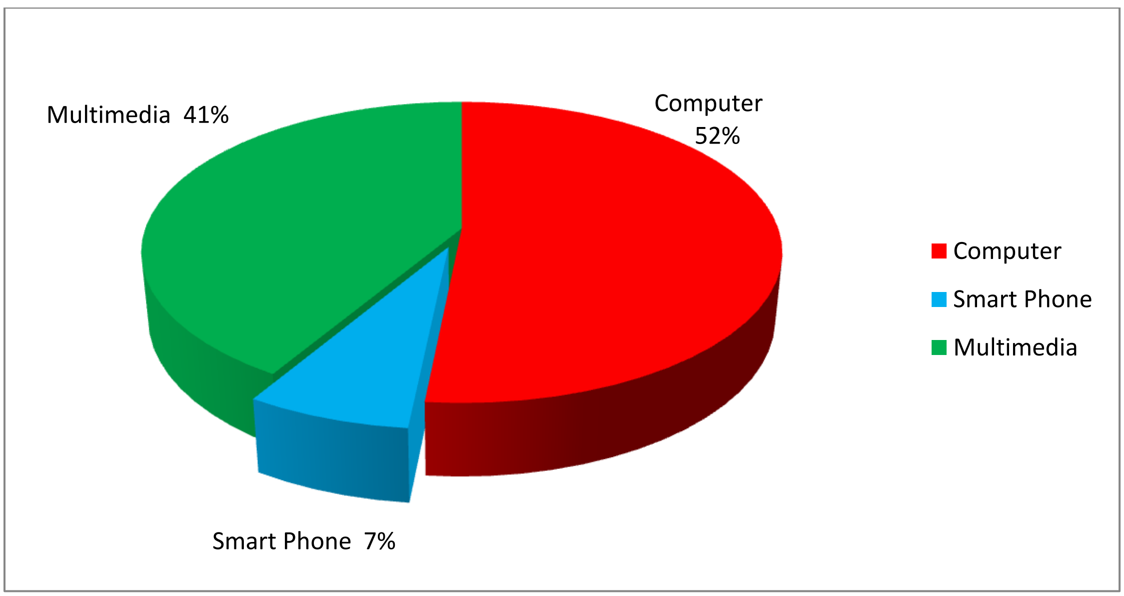


Fig 4.119: Hardware used by Teachers

The most utilized hardware in the classroom by the teacher is the computer followed by multi media and lastly the smart phone. This was true as seen by the area of study in the following Table 4.70.

Hardware used in the Classroom		Area of Study: Business Management	Area of Study: Information Technology
Computer	Count	237	173
	%	**80.6%**	**84.4%**
Smart Phone	Count	32	24
	%	**10.9%**	**11.7%**
Multimedia	Count	193	136
	%	**65.6%**	**66.3%**

Table 4.70: Type of hardware in Area of Study

The pattern of response was seen across the age group of respondents as well as both students at the undergraduate and the post graduate levels. Students studying at full time, part time and Saturday also agreed to the order in the listing - the computer followed by multi media and lastly the smart phone.

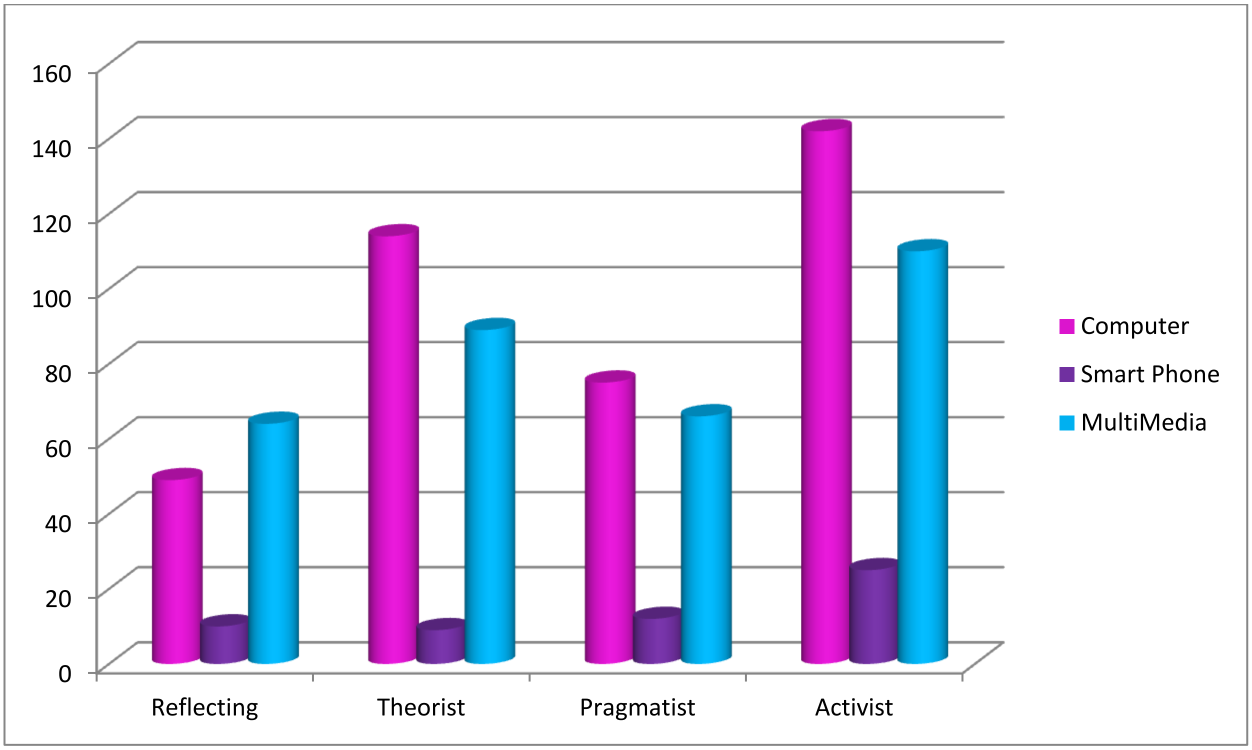


Fig 4.120: Hardware used by Teachers by category of Learning Style

The hardware choices were also seen to be true when cross tabulated against the category of student learning style as illustrated in Fig 4.120 - the computer followed by multi media and lastly the smart phone.

4.7.8 WHAT SOFTWARE USED BY TEACHERS IN THE CLASSROOM

While students' perception of teachers' skills in ICT included the options of word processor, spreadsheet, database, search engine, communication and social network, the software utilized in the classroom looked at software for:

- Word processing
- Spreadsheet

- Database
- Presentation
- Instructional Software

The pie chart in Fig 4.121 gives the distribution of what software is used by Teachers in the classroom. The software utilized the most is for presentation (46%) whilst software for instructional software (11%) was used the least in the classroom.

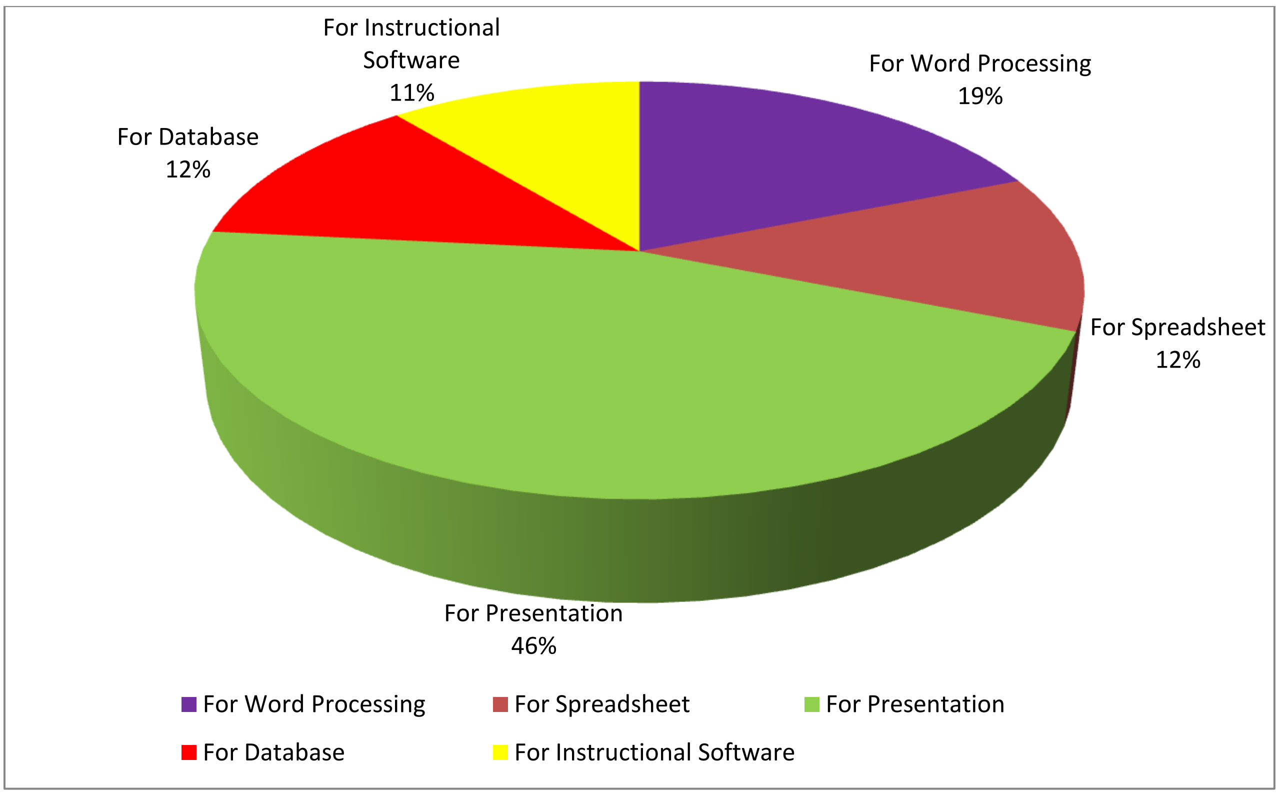


Fig 4.121: What software used by Teachers in the classroom

		Area of Study	
		Business	**Information Technology**
	For Word processing	**99**	**94**
	For Spreadsheet	**69**	**55**
software	For Presentation	**275**	**190**
	For Database	**37**	**90**
	For Instructional Software	**46**	**66**

Table 4.71: What software used by Teachers in the classroom by Area of Study

The above table encapsulates the different software used by Teachers in the classroom. It was observed that students at both areas of study under consideration, software for presentation were placed at the top of the list followed by word processing software. Business Management students identified software for spreadsheets as number three on their listing while the Information Technology students identified Software for database as third on their list. All students agreed that instructional software was next on the listing as illustrated in Fig 4.122.

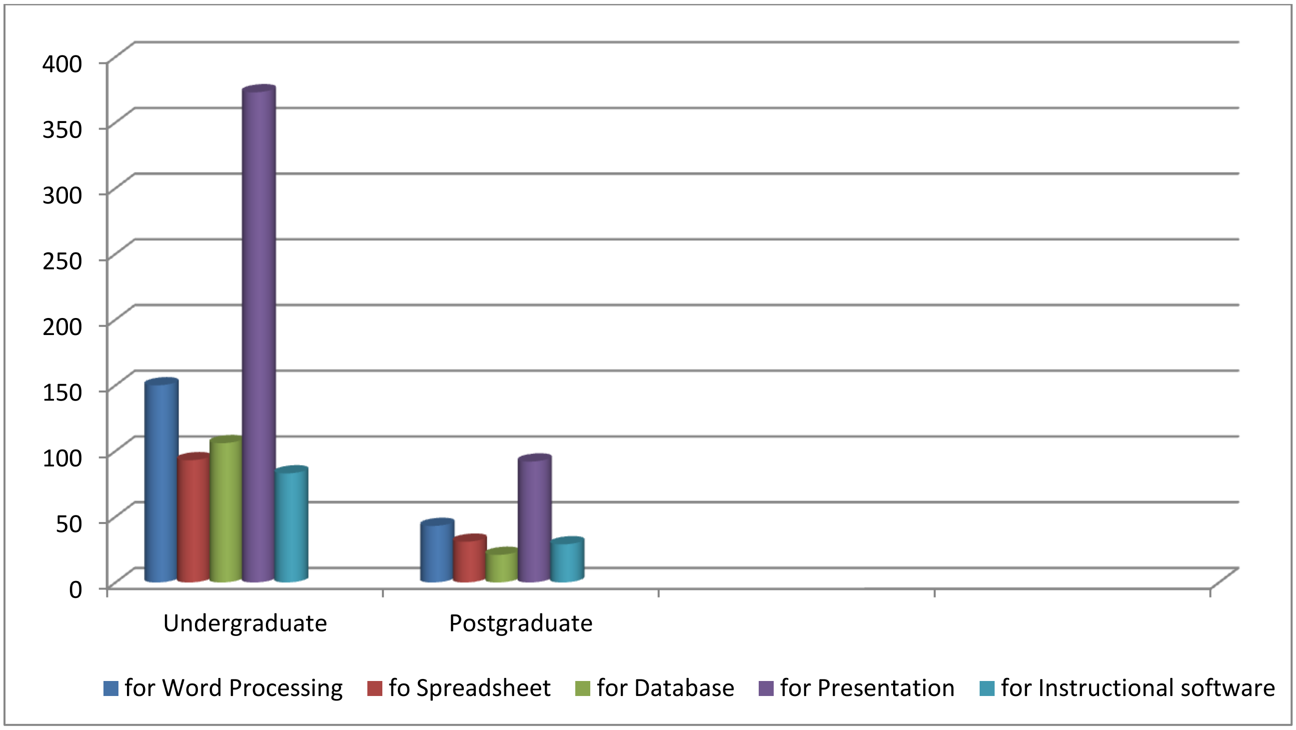


Fig 4.122: What software used by Teachers in the classroom according to year of study

Students studying at the three options of listed in order from highest to lowest as follows:

1. Word processing
2. Spreadsheet
3. Database
4. Presentation
5. Instructional Software

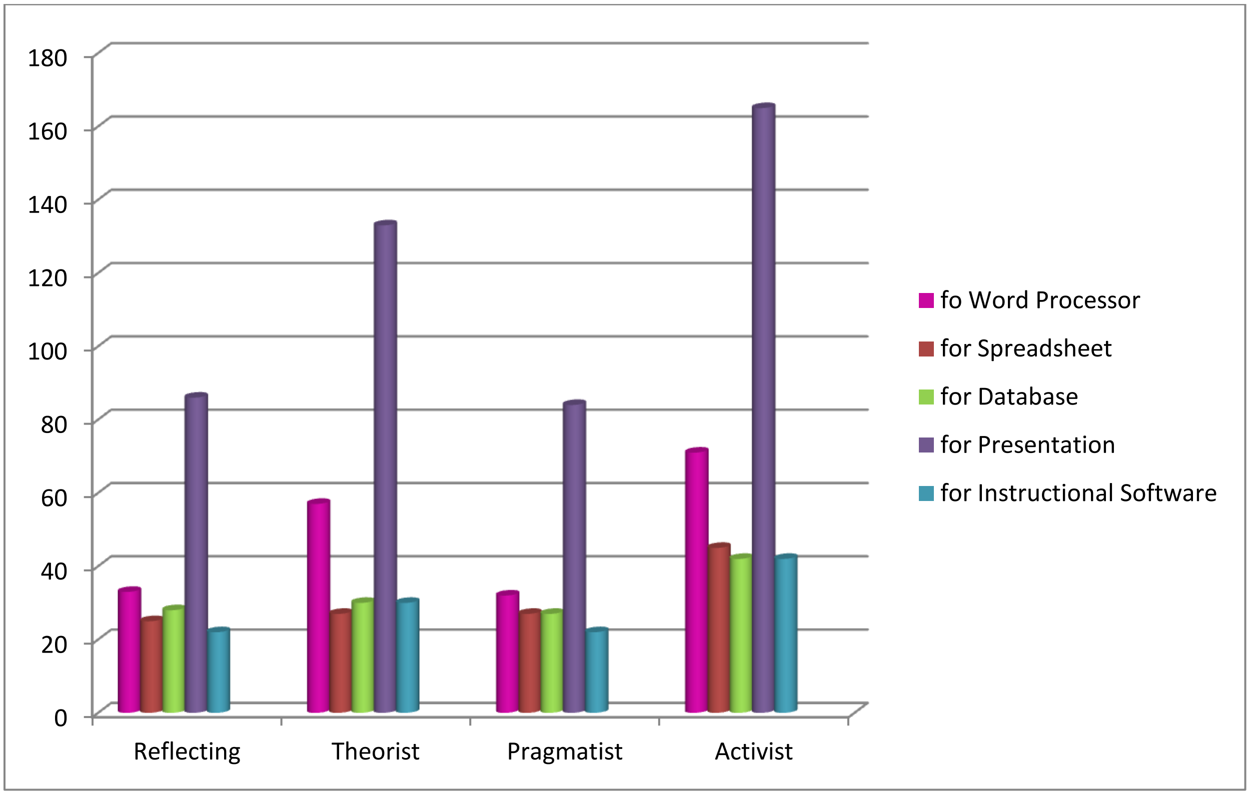


Fig 4.123: What software used by Teachers in the classroom according to category of learning style

When the different software used by Teachers in the classroom was analyzed against the category of student learning style – reflecting, theorist, pragmatist and activist the results tallied showed as seen in the following chart- Fig 4.123. Presentation and word processing software were at number one and two respectively and instructional software was at the bottom of the ladder.

4.7.9 TEACHERS' INTEGRATION OF ICT INTO TEACHING AND LEARNING PROCESSES IN THE CLASSROOM

UNESCO (2004) classifies ICT in education into three broad categories: *pedagogy, training, and continuing education*. Pedagogy is focused on the effective learning of subjects with the support of the various components of ICT. Olakulehin (2007) emphasizes that the pedagogic application of ICT involves effective learning with the aid of computers and other information technologies as learning aids, which play complementary roles in the classroom, rather than supplementing the teacher.

Research and active projects, such as those run by EdQual, a Research Consortium of educational institutions in the UK and Africa (Ghana, Rwanda, South Africa, Tanzania) on Educational Quality, typically indicate two main reasons why teachers use ICT:

3. teachers feel that their own use of computers benefits their learners, and
4. teachers feel learners benefit from using computers themselves; they gain confidence, self-esteem and renewed motivation.

Responses for the question 'What is the extent of teachers' integration of ICT into teaching and learning processes?' ranged from never to occasionally to frequently to almost always. Students in both areas of study – Business Management and Information Technology - indicated that teachers frequently integrated ICT into teaching and learning processes as illustrated in the following chart, Fig 4.124.

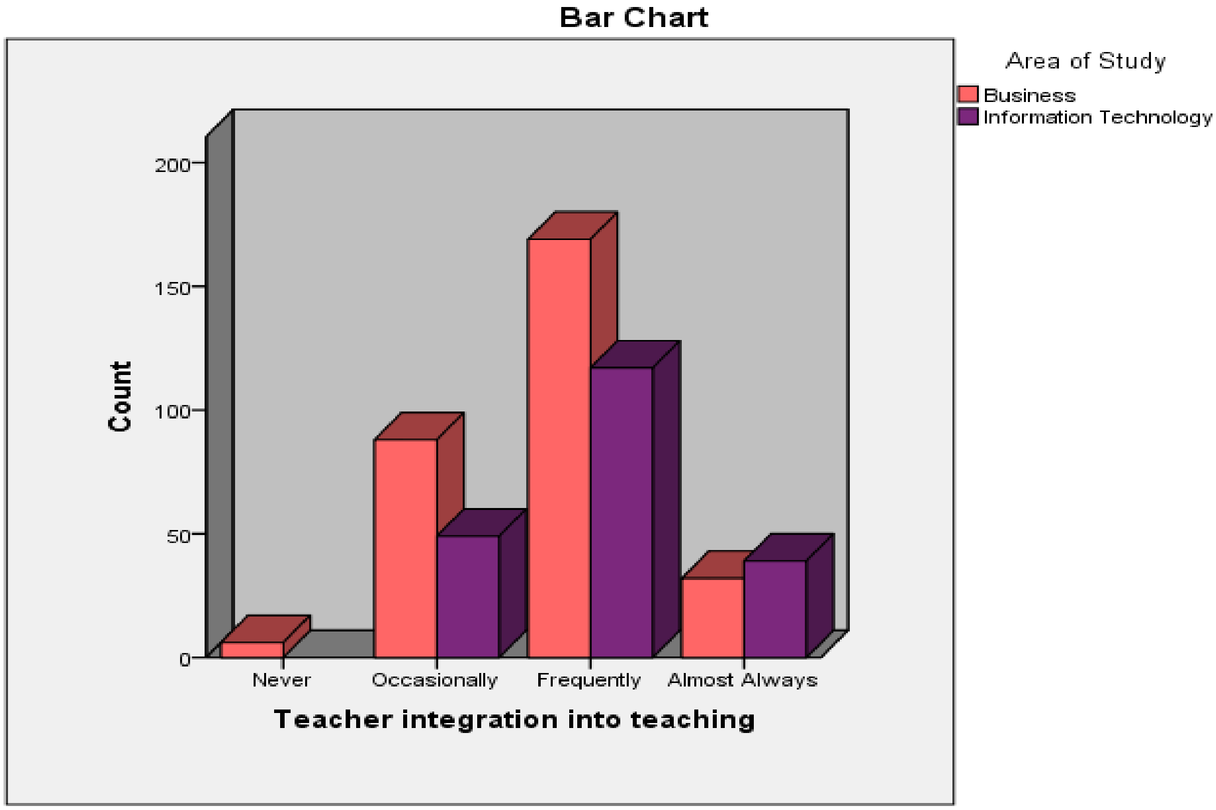


Fig 4.124: Teacher integration of ICT into teaching and learning according to area of study

This pattern of response by students was also evident according to the time option studying and the age group of the students as well as year of study where the ranking were as follows:

1. Frequently
2. Occasionally
3. Almost Always
4. Never

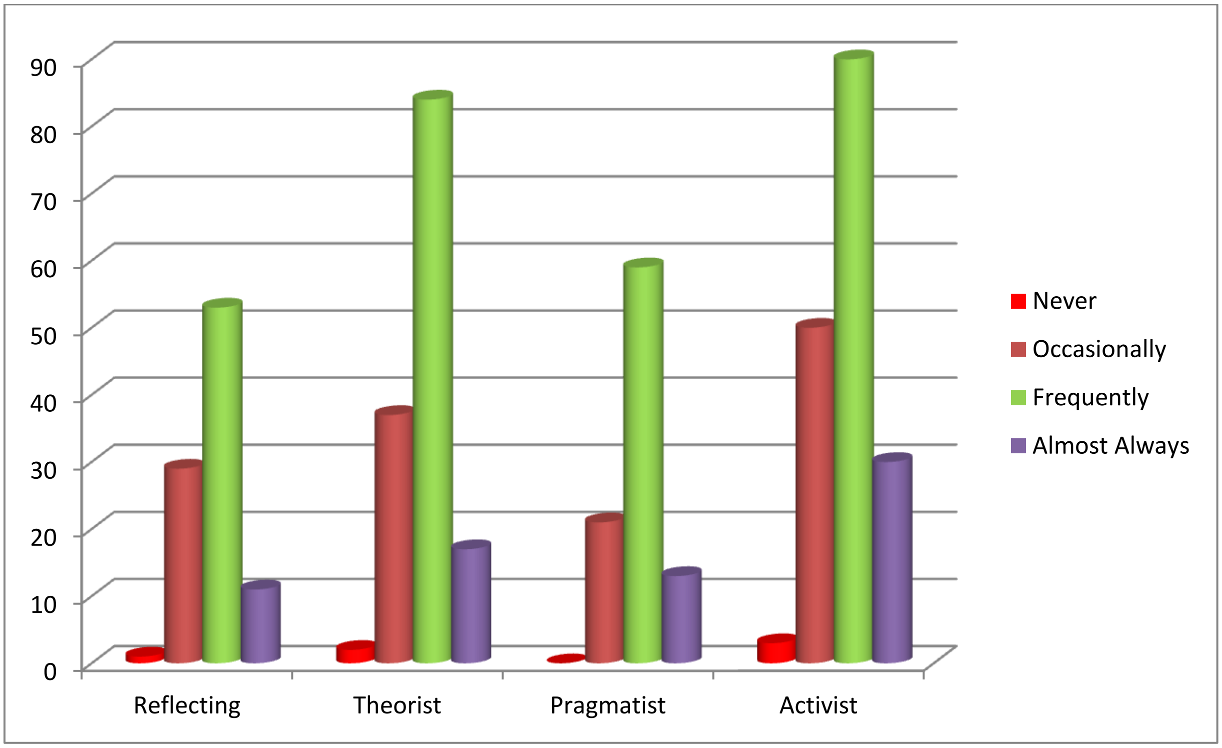


Fig 4.125: Teacher integration of ICT into teaching and learning according to category of learning style

The responses were also seen to be true when the extent of teachers' integration of ICT into teaching and learning processes was cross tabulated against the category of student learning style as illustrated in Fig 4.125.

4.7.10 THE FREQUENCY OF USE OF ICT ON TEACHING ACTIVITY

The real challenge for educationists is how to harness the potential of ICT to complement the role of a teacher in the teaching and learning process.

This question wanted to gauge from the students the extent of the frequency of the use of ICT on giving instructions to students, communicating with students as well as organizing class discussion, demonstrations and presentations. It also sought to enquire about assessment of students' learning through tests using ICT, if ICT is used to send feedback to students and if ICT is used to support collaboration amongst students. Responses ranged from never to occasionally to frequently to almost always**.**

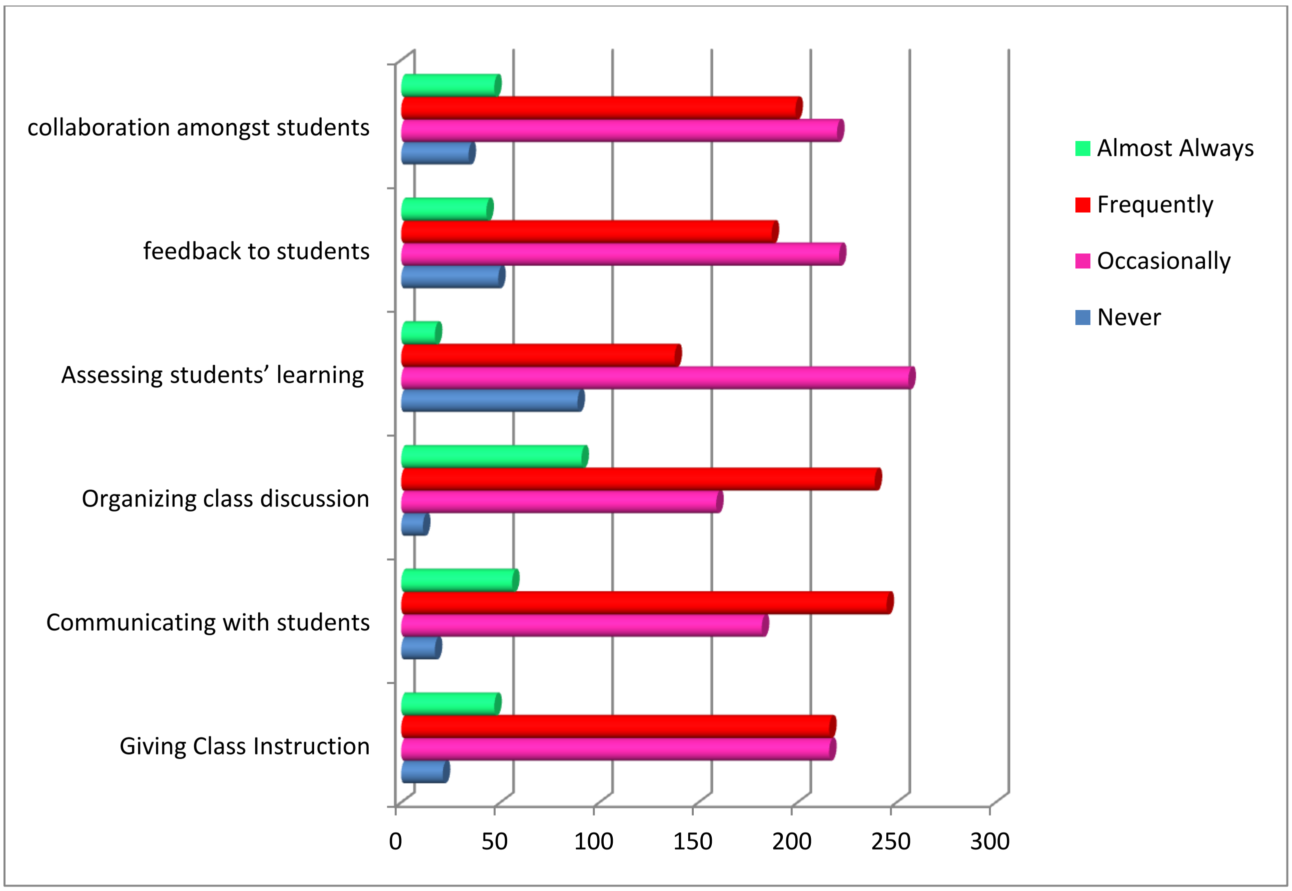


Fig 4.126: Frequency of use of ICT on teaching activity

The students surveyed identified that ICT was used in the various teaching activities considered tied for top of the list as frequently and occasionally, followed by almost always and never placed at the bottom (see Fig 4.126). For the activities of communicating with students and organizing class discussion, demonstrations and presentations it was observed that frequently topped the list and occasionally was second. For giving class instructions frequently and occasionally tied with two hundred and sixteen (216) students. For the remaining three activities of assessing students' learning through tests, sending feedback to students and supporting collaboration amongst students, the data indicated that occasionally was at the top of the listing while frequently was at number two. For all of the six activities - Class Instructions, Communicating with Students, Organizing Class discussion, Assessing student learning, Feedback to students, Collaboration amongst students - almost always placed third and never at the bottom of the list.

		Class Instructions				Total
		Never	Occasionally	Frequently	Almost Always	
Category of student learning style	Reflecting Category	4	37	42	11	94
	Theorist Category	5	54	69	12	140
	Pragmatist Category	4	40	40	9	93
	Activist Category	8	85	65	15	173
Total		21	216	216	47	500

		Communicating with Students				Total
		Never	Occasionally	Frequently	Almost Always	
Category of student learning style	Reflecting Category	2	37	45	10	94
	Theorist Category	5	53	66	16	140

	Pragmatist Category	6	30	41	16	93
	Activist Category	4	62	93	14	173
Total		17	182	245	56	500

		Organizing Class discussion				Total
		Never	Occasionally	Frequently	Almost Always	
Category of student learning style	Reflecting Category	3	21	58	12	94
	Theorist Category	5	41	68	26	140
	Pragmatist Category	2	37	28	26	93
	Activist Category	1	60	85	27	173
Total		11	159	239	91	500

		Assessing student learning				Total
		Never	Occasionally	Frequently	Almost Always	
Category of student learning style	Reflecting Category	12	51	30	1	94
	Theorist Category	31	67	34	8	140
	Pragmatist Category	17	43	30	3	93
	Activist Category	29	95	44	5	173
Total		89	256	138	17	500

		Feedback to students				Total
		Never	Occasionally	Frequently	Almost Always	
Category of student learning style	Reflecting Category	5	41	43	5	94
	Theorist Category	18	59	51	12	140
	Pragmatist Category	8	35	40	10	93
	Activist Category	18	86	53	16	173
Total		49	221	187	43	500

		Collaboration amongst students				Total
		Never	Occasionally	Frequently	Almost Always	

Category of student learning style	Reflecting Category	5	33	43	13	94
	Theorist Category	22	51	60	7	140
	Pragmatist Category	2	44	34	13	93
	Activist Category	5	92	62	14	173
Total		34	220	199	47	500

Table 4.72: Frequency of use of ICT on teaching activities and learning according to category of learning style

When the frequency of the use of ICT on giving instructions to students, communicating with students as well as organizing class discussion, demonstrations and presentations. It also sought to enquire about assessment of students' learning through tests using ICT, if ICT is used to send feedback to students and if ICT is used to support collaboration amongst students was cross tabulated against the category of student learning style it was observed that frequently and occasionally was found to be placed at first and at second for certain activities by the various activities and almost always came in third for all activities and never also placed last for all activities by all categories for all students as seen in the above table 4.72.

In a research project entitled ***'Developing use of ICT to enhance teaching and learning in East African schools'*** commissioned by the University of Cambridge and Department for International Development in May 2010 it was ascertained that ICT facilitates enhanced learning in subject areas and learning at home on one's own, and these require the use of new tools like modeling, simulation, use of databases. Using ICT is also perceived as having the advantage of heightening motivation for the learner; helping recall previous learning; providing new instructional stimuli; activating the learner's response; providing systematic and steady feedback; facilitating appropriate practice; sequencing learning appropriately; and providing a viable source of information for enhanced learning. (Hennessy et al, 2010)

4.8 SECTION 6: INSTITUTIONAL ICT SUPPORT

This section's primary aim was to understand the students' view of the institutional support of ICT. It looked at the efficiency of the ICT technical Support as well as the timeliness and also the efficiency of the various ICT tasks and problems solved by the support technical team.

4.8.1 TECHNICAL ICT SUPPORT

From the survey conducted it was identified that students found that the ratio of technical ICT support staff to computer labs at the School of Accounting and Management was found to be moderate as illustrated in Fig 4.127: Ratio of technical ICT support staff to computer labs. The range of response ranged from low to medium to high whereby:

- Low: 1 staff:9 computers to 1 staff: 6 computers
- Medium: 1 staff:5 computers to 1 staff: 2 computers
- High: 1 staff:1 computer

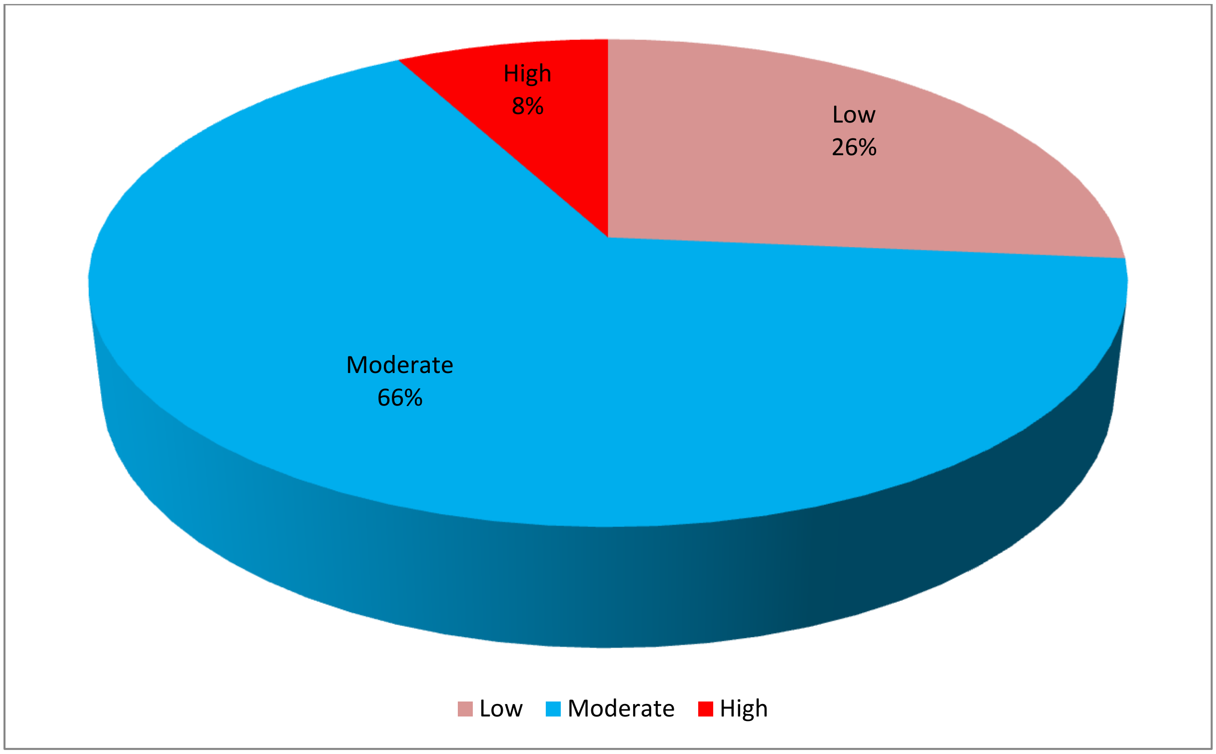


Fig 4.127: Ratio of technical ICT support staff to computer labs

4.8.2 ICT TASKS SOLVED IN TIMELY AND EFFICIENT MANNER

When the issue of the efficiency of ICT technical support was addressed, the students surveyed were asked to choose one of the four responses –agree, tend to agree, tend to disagree or disagree. From the bar chart below (see Fig 4.128), 64% of the students tend to agree and 22 % agreed that the ICT technical support was efficient whilst 11% tend to disagree and a very small percentage (2%) disagreed.

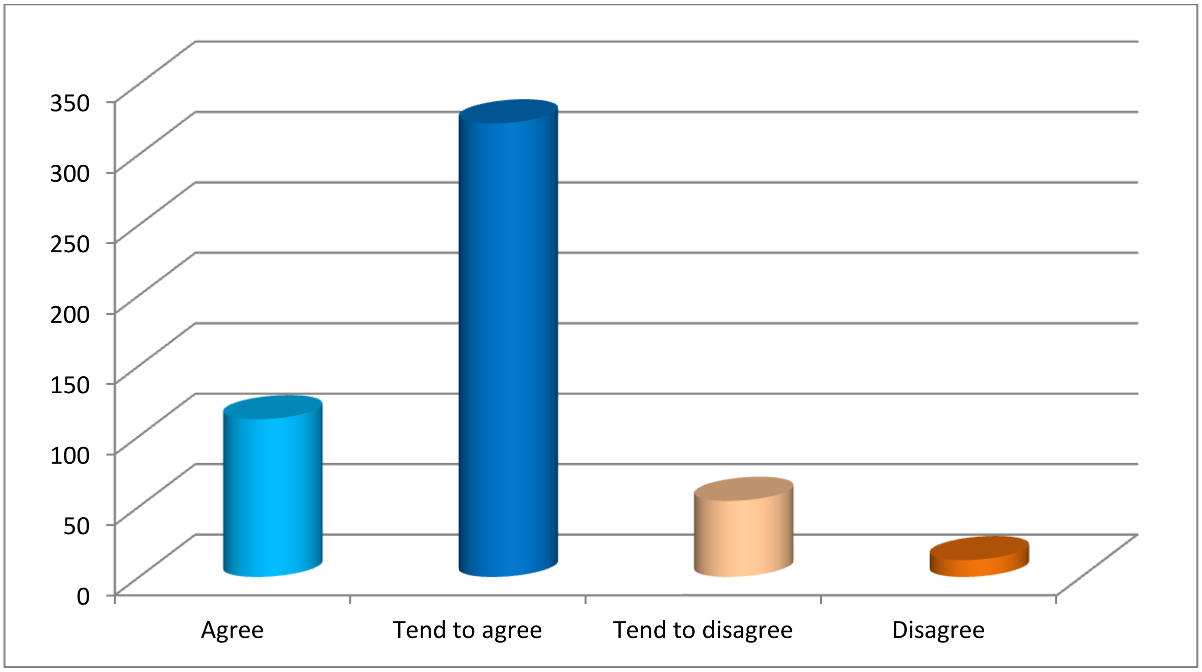


Fig 4.128: Efficiency of ICT technical support

Students studying the two areas of Business Management and Information Technology were asked if they agreed, tend to agree, tend to disagree or disagree to the statement ‘ICT tasks and problems solved in timely and efficient manner’. Students in both areas of study tend to agree and agree that the ICT tasks and the various associated problems were solved in both a timely as well as efficient manner while tend to disagree and disagree had smaller numbers again in both areas of study as demonstrated in Fig 4.129 below.

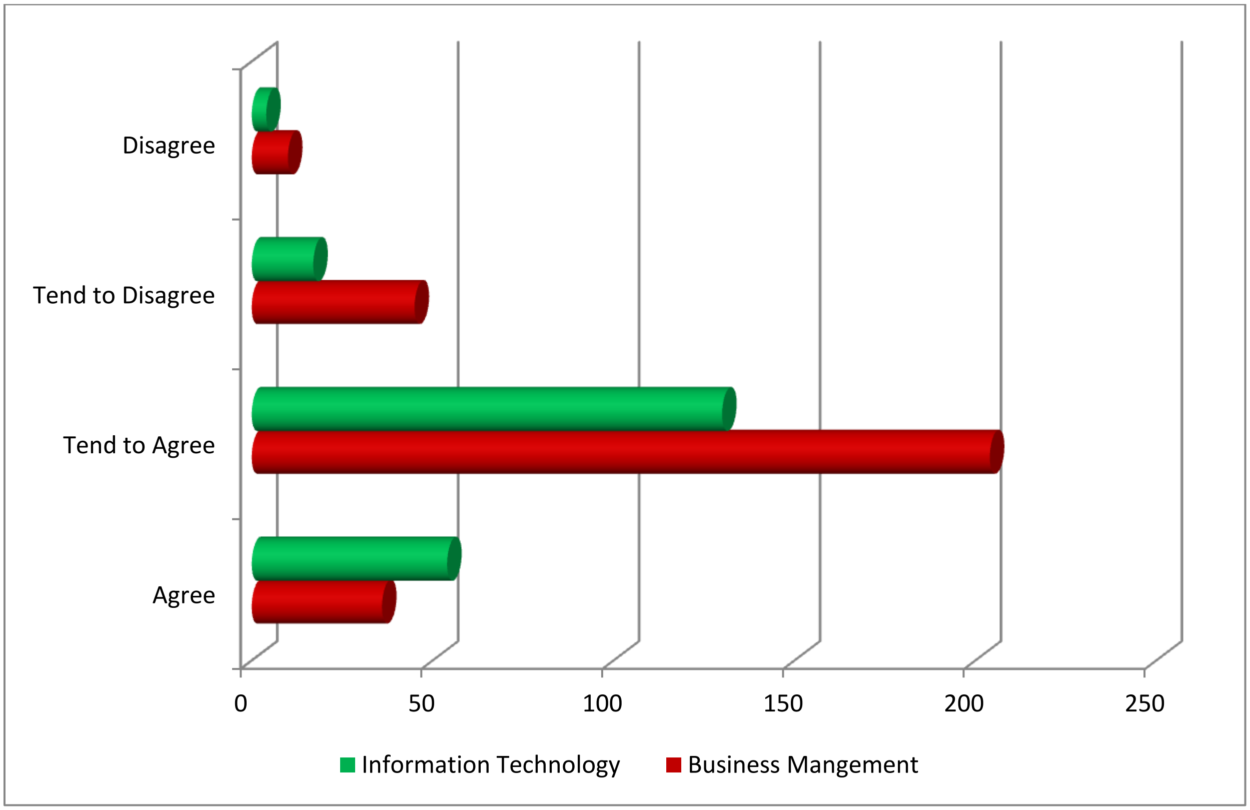


Fig 4.129: ICT tasks & problems solved in timely and efficient manner by Area of Study

4.8.3 EXTENT OF TECHNICAL ICT ASSISTANCE

For the extent of technical ICT assistance provided to the students four basic categories were listed along with other. The categories included:

- Ongoing support for ICT users
- General ICT use in common applications
- Hardware
- Software

Students were asked to tick as many as they thought applicable to them, As a consequence the number of responses will be more than five hundred.

From Fig 4.130, it was seen that overall, the student population ranked the activities as follows:

1. Ongoing support for ICT users **33.7%**
2. General ICT use in common applications **28.7%**
3. Software **18.8%**
4. Hardware **17.9%**
5. Other **0.9%**

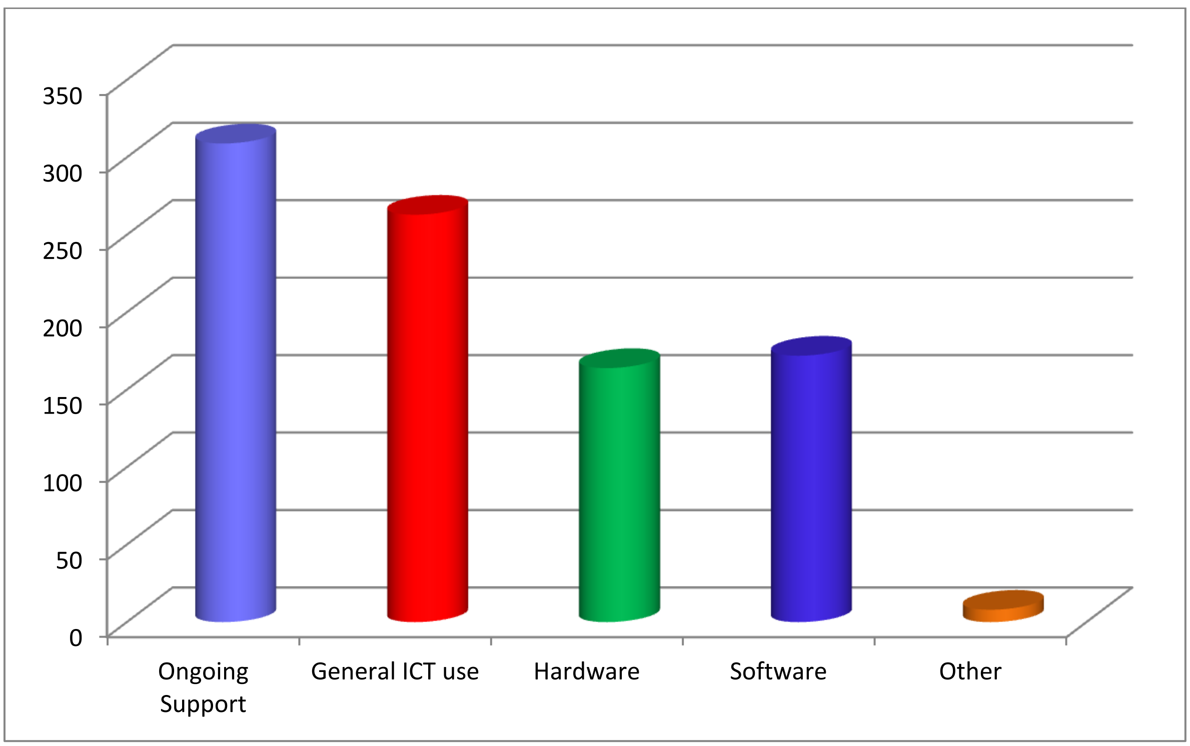


Fig 4.130: Technical ICT assistance

Students studying the two areas of Business Management and Information Technology were asked the extent of technical ICT assistance provided to the students. The Students in both areas of study agreed to the following order in the list for the various activities considered.

	Area of Study		Total
	Business	**Information Technology**	
Ongoing Support for ICT users	**183**	**126**	309
General ICT use in common applications	**148**	**115**	263
Software	**83**	**89**	172
Hardware	**78**	**86**	164
Other	**8**	**0**	8

Table 4.73: Technical ICT assistance by Area of Study

4.9 CONCLUSION

Data was collected at the School of Accounting and Management during the period March 2014 to May 2014 from students studying Business Management as well as Information Technology courses from both the undergraduate and postgraduate levels. General information was collection on the area of study, year of study, option of study, age group as well as the students IT skills at the start of their study and at present when the study was conducted.

Sections 2 and 3 (Honey and Mumford (2000)) of this survey were designed to help gain an understanding of students' learning style so that an educator can incorporate the various learning styles into students' daily learning activities. Data was also gathered with regards to the use of ICT by students with respect to types of computer applications used, as well as what the uses of the internet and what were some of the problems faced in accessing eResources.

Data was also gathered about students' perception of the applications of ICT in Teaching with respect to critical thinking as well as collaboration and interaction amongst students and teachers.

5.0 CONCLUSION

5.1 INTRODUCTION

The Objectives of this research were as follows:

4. To analyze case relevance between epistemology and pedagogy in tertiary education

5. To analyze how teaching methods and strategies have been influenced by IT.

6. To analyze how to develop positive attitudes towards technology usage that support lifelong learning and collaboration amongst students.

Data was collected at the School of Accounting and Management during the period March 2014 to May 2014, the sample was selected randomly in clusters. The clusters consisted of students studying Business Management as well as Information Technology courses from both the undergraduate and postgraduate levels. Six hundred and forty (640) questionnaires were distributed in total. Five hundred (500) questionnaires were distributed to undergraduate students studying Business Management and Information Technology courses in both the North and South Campuses. Eighty percent (80%) – four hundred (400) questionnaires – were completed by students and were subsequently returned to the researcher. One hundred and forty (140) questionnaires were distributed to post graduate (MBA and MSc) students and 71% (100 questionnaires) were completed and returned to the researcher. There was a high percentage of return of questionnaires, in the case of the undergraduates 80% and for postgraduate courses, 71%. Two hundred and ninety five

(295) students were studying Business which accounted for 59% of the sample and the other 41% (two ***hundred*** and five students) were studying Information Technology.

5.2 OBJECTIVE 1: *TO ANALYZE CASE RELEVANCE BETWEEN EPISTEMOLOGY AND PEDAGOGY IN TERTIARY EDUCATION*

Sections 2 and 3 (Honey and Mumford (2000)) of this survey were designed to help gain an understanding of students' learning style so that an educator can incorporate the various learning styles into students' daily learning activities. The main aim of Section Two: Doing and Watching investigated whether students preferred **Doing** or **Watching** on Kolb's processing continuum with reference to the variables of area of study, year of study, option of study, age group and IT skills (at the start and at present).

The data collected indicated that a higher percentage of students preferred **Doing -**. having an experience and these students fell into Honey and Mumford's learning style category of Activist. Honey and Mumford (2000) explained that in this category meant that the students learn by doing. This type of student has an open-minded approach to learning, involving him/her fully and without basis in new experiences.

There were also a lesser percentage of students who preferred **Watching** - reviewing an experience. These students were found to be in the learning category of the Reflector. Honey and Mumford (2000) explained that the reflector learns by observing and thinking about what happened. These students preferred to stand back and view experiences, collecting data and taking time to work towards an appropriate conclusion. These students also prefer to learn from activities that allow watching as well as thinking and they also need to review what has happened through brainstorming and in cooperative groups. Students in this category also prefer to view situations from various perspectives.

Whilst Section 3 : Thinking and Feeling investigated whether students preferred **Thinking** or **Feeling** on Kolb's perception continuum with reference to the variables area of study, year of study, option of study, age group and IT skills (at the start and at present). This section differentiated whether students fell into the category of theorist (thinking) or pragmatist (feeling). According to Honey and Mumford (2000) in the theorist learning style the students like to understand the theory behind the actions. They need to understand models, concepts and facts in order to engage in the learning process. They tend to prefer to analyze and synthesize, drawing new information into a systematic and logical 'theory'. On the other hand, with the pragmatist learning style, Honey and Mumford (2000) explain that these students need to be able to see how to put the learning into practice into the real world. Abstract concepts are of limited use to these students unless they can see a way to put the idea into action in the real world.

The combination of two lines of axis (continuums) each formed between Kolb (1985) 'grasping an experience' (Doing/watching) and 'transforming an experience' (thinking/feeling) defined the preferred learning style of the student as illustrated in following Table.

Doing/Watching	***Thinking/Feeling***	***Preferred Learning Style***
Watching	Feeling	Reflector
Doing	Feeling	Activist
Watching	Thinking	Theorist
Doing	Thinking	Pragmatist

Table 5.1: Preferred Learning Style: Honey and Mumford (2000)

What was evident from this survey is that all four learning styles were present in the population surveyed at School of Accounting and Management. No new learning style category emerged from the results but all four learning category styles – reflecting, theorist, pragmatist and activist – as identified by Kolb (1980) and further worked on by prescribed by Honey and Mumford (2000) were found across all variables of area of study, year of study, option of study, age group as well as IT skills and are true for students at School of Accounting and Management. Therefore, what can be further concluded is that IT is differentiating them from traditional students.

What was also evident was that each learner encapsulates a combination of all four categories of learning throughout his/her experience; however, one always comes to the forefront whilst learning. As a learner, a student would

1. Have an experience
2. Reflect on an experience
3. Draw one's conclusion (theorize) and
4. Put the theory into practice.

In order to enhance the learning process of the students in the various categories of learning, technology must be harnessed so as to support the learning process. Morgan

(1996) as cited by Rumpagaporn (2007) explained that after the teachers had identified the concepts that were required by the students to learn and had made the necessary links to what students already knew, they then had to consider the technology that would be most suitable to enhance the learning environment in the classroom.

Using ICT technologies effectively in education meant that the focus shifted from teaching to learning and more importantly the students were responsible for their own learning. The focus of the teaching profession has evolved from an emphasis on teacher-centred, lecture-based instruction to student-centred, interactive learning environment (UNESCO, 1998).

Research has shown that the quality of learning can be significantly enhanced when ICTs are approached and utilized to promote dynamic, interactive thinking (Karakaya and Senyapth, 2007; Hirschheim, 2005 as cited by Juang Wang, 2008). ICTs can enhance critical thinking, information handling skills, high-level conceptualization and problem solving. Since many new technologies are interactive they are already being used extensively in the classroom to create and sustain a wide range of collaborative processes and activity.

Porter (1991) as cited in Rumpagaporn (2007) indicated that students brought with them their own set of knowledge content, a variety of thinking skills and their attitudes towards critical thinking into the classroom environment. Their characteristics were subsequently modified through learning activities and their personal experiences, students' practices and pedagogy and curriculum. He further concluded that the final product was the students' outcomes, one of which could be the critical thinking skill.

The factors looked at in this questionnaire with regards to the enhancement of critical thinking by use of ICT were analyzing, discriminating, logical reasoning, transforming knowledge, applying standards, information seeking and predicting.

Results of this survey indicated that of all students surveyed, it was evident that the top critical thinking skills were identified that have been enhanced by the use of ICT include:

- Information Seeking 22%
- Analyzing 22%
- Transforming Knowledge 19%
- Logical Reasoning 17%

The critical skills that were thought to have been enhanced the least by the use of ICT were that of predicting (6%) and discriminating at 4%.

When students' results were examined, the response patterns of the critical skills that were enhanced by the use of ICT were also consistent across the students surveyed irrespective of their age, area of study – both Business Management and Information Technology, year of study (undergraduate or postgraduate) or option of study (whether they attend full time, part time or Saturday classes).

The skills looked at in the survey that were enhanced by ICT were grammar, punctuation, speaking, writing, spelling, listening and reading.

The skills that were most enhanced by ICT by the students were identified as:

- Reading 23%
- Writing 19%
- Grammar 16%
- Spelling 13%

While the least students' skills enhanced included were that of listening (8%), speaking (10%) and punctuation at 11%. Interestingly, MSc students pursuing the Information Technology course indicated that one of the skills that were enhanced by using ICT for them was that of listening (42%). This skill was seen at the tail end of list for all other students across age groups, area of study as well as option of study in contrast with the MSc students who identified it at the top of their list.

The majority of the Information Technology and Business Management students identified that the use of ICT has an impact on the learning process. 20% of the students surveyed articulated that teachers should use ICT during teaching whilst the smallest percentage said that they knew how to use ICT but were not interested in using it for learning. '*Feel fear from the use of ICT'* accounted for 12% of students in Information Technology courses and 7.5% in Business Management. The evidence indicated that all students recognized that ICT accelerates the learning process as well as its use improves grades.

Students studying at all levels both undergraduate (years 1, 2 and 3) and postgraduate (MBA and MSc) identified the top five factors of use of ICT in their learning are as follows:

- Use of ICT has an impact on learning process
- ICT accelerates learning process
- Teachers should use ICT during teaching
- Use of ICT for getting information is better than in the library
- Use of ICT improves grades

Whilst the least influential factors include:

- Getting information from print material is better than using ICT
- Know how to use ICT but not interested in using if for learning.

What are students actually doing on their computers and the internet? There are a number of activities that students are involved in on a daily basis. Studies have indicated that the use of email as well as word processing had become ubiquitous (ECAR 2008:46) as identified in this study as well. Research by McNeely (2005) at North Carolina State University has shown that the average student will use a computer for the most fundamental computer skills: word processing, creating a spreadsheet, using Web browsers, and e-mail. They will also use the computer for homework, online chatting, checking e-mail, and surfing the Internet. The more advanced users will know how to write a simple Web page, update a ready-made blog site, or download music and movies and burn CDs. This remains true as evidenced by the results from this present study.

The top five uses of the Internet by students are as follows:

- eMail
- Study purpose
- Preparing Assignments
- Literature Review
- Songs/Movies tied with Surfing the Internet.

It was interesting to note that 25% of students surveyed indicated that they used Wikipedia as their preferred database when searching subject topics. Follow up discussions with students gave some interesting revelations:

- *'We can't use Wikipedia as a source, but use it as a stepping – stone to other sources'.*
- *'Reliable sources are easy to find I've never heard anyone get a high grade when using Wikipedia as their source'*
- *'Lecturers drill it into you from year 1 not to copy and paste. They constantly explain the importance of referencing'.*

ECAR (2008) report also suggests that students use Wikipedia as a sounding board to other portals which were in fact consistent with the results from the present study.

5.3 OBJECTIVE 2: TO ANALYZE HOW TEACHING METHODS AND STRATEGIES HAVE BEEN INFLUENCED BY IT

One of the major objectives of this study was to analyze how effectively teaching methods and strategies have been influenced by the IT.

Haddad and Draxler (2002) categorise the technology use in a classroom into five levels: presentation, demonstration, drill and practice, interaction and collaboration. Building on this, Thijs et al. (2001) argue that use of technology creates a learner-centred environment by:

- Motivating learners by combining text, sound, colour and moving images that enhance content for easier learning;
- Facilitating acquisition of basic skills through drill and practice (not very learner-centred sounding though). This is better accomplished by education television broadcasts that teach literacy and numeracy at basic education level; and
- Enhancing teacher training by improving access to and the quality of teacher training.

UNESCO (2002) has identified that teachers' pedagogical approaches are affected by various factors. Firstly, they are affected by knowledge about their own subject. There is a clear distinction between teachers choosing ICT and resources to fit within a particular topic area and those who choose resources merely to present students' work in a new way without any application to the topic area under consideration. It should also be noted that when teachers use their knowledge both of the subject and also of how their students understand the topic area, their use of ICT has a more direct effect on their students' understanding.

Hennessy et al (2010) indicated that the impact on pedagogy can be summarized as being strategies that are:

- more learner-centred,
- more cooperative and collaborative,
- more active learning; and
- based on greater access to information and sources of information.

These impacts on pedagogy relate directly to the impacts on teachers, in particular the roles they play, their use of information, and their workload.
Studies by Breen et al. (2001) and Brotcorne (2005) have looked at students' computer and internet adoption from a university-wide perspective. Both of these studies found computer use to be a major element of the student's working day, but Breen et al. (2001) reported that students were sometimes discouraged from using ICT when in university due to access limitations and the cost of personal ownership of equipment. Other studies such as Sicilia's study in 2005 as cited in Bingimlas (2009) stated that teachers complained about how difficult it was to always have access to computers. He further articulated that a teacher may not have access to ICT materials because most of these were shared amongst other teachers. Becta (2004) also identified that the inaccessibility of ICT resources is not always due to the non-availability of the hardware or software or other ICT materials within the school.

In this study, the major barriers to access of eResources have been identified as:

4. Slow internet connectivity
5. Lack of time
6. Lack of access

Whilst the factors at the bottom of the list include:

3. Lack of support from both the IT staff as well as Library staff
4. Teachers do not use ICT resources during their lecture.

These results were consistent with that of literature reviewed.

The technologies available in classrooms today range from simple tool-based applications (such as word processors), to online repositories of scientific data and include other forms such as electronic versions of primary historical documents, handheld computers, closed-circuit television channels, and two-way distance learning classrooms. Prensky (2005) also strongly asserts that cell phones can be used to learn.

Whilst there were barriers faced in accessing eResources, students identified that they perceived their teachers to have skills in ICT when delivering in the classroom and also their use of various software packages during delivery. Some of the skills in ICT that the students perceived their teachers have acquired included word processor, spreadsheet, database, search engine, communication and social network, the hardware utilized in the classroom included computer (laptop),smart phone and multimedia. The software utilized in the classroom looked at software for:

- Word processing
- Spreadsheet
- Database
- Presentation
- Instructional Software

The study indicated that students perception is that teachers use social network (26%) the most and communication in the least with 7% from the various options of word processor, spreadsheet, database, search engine, communication and social network. While the most utilized hardware in the classroom by the teacher is the computer followed by multi media and lastly the smart phone.

Students listed the software utilized the most is in order from highest to lowest as follows:

1. Presentation
2. Word processing
3. Database
4. Spreadsheet
5. Instructional Software

The Institutional ICT Support also impacts on the teaching strategies and methods used in the classroom. From the survey conducted it was identified that students found that the ratio of technical ICT support staff to computer labs at the School of Accounting and Management was found to be moderate. The range of response ranged from low to medium to high whereby:

- Low: 1 staff:9 computers to 1 staff: 6 computers
- Medium: 1 staff:5 computers to 1 staff: 2 computers
- High: 1 staff:1 computer

When the issue of the efficiency of ICT technical support was addressed 64% of the students tend to agree and 22 % agreed that the ICT technical support was efficient whilst 11% tend to disagree and a very small percentage (2%) disagreed.

For the extent of technical ICT assistance provided to the students four basic categories were listed along with other. The categories included ongoing support for ICT users, general ICT use in common applications, hardware and software. The student population ranked the activities as follows:

6. Ongoing support for ICT users **33.7%**
7. General ICT use in common applications **28.7%**
8. Software **18.8%**
9. Hardware **17.9%**
10. Other **0.9%**

Learners are expected to collect, select, analyze, organize, extend, transform and present knowledge using ICT in an authentic and active learning paradigm. Teachers, on the other hand, are expected to create new, flexible and open learning environment with interactive, experiential and multimedia based delivery system. ICT should help teachers and learners to communicate and collaborate without boundaries, make learners autonomous and allow teachers to bring the whole world into classroom activities Majumdar (2006).

From the present study it was determined that students studying both courses in Business Management and Information Technology agreed that ICT enhanced the interaction between the teacher and student whilst a very small percentage disagreed, It was also found that the use of ICT enhanced the collaboration amongst themselves for various learning activities, The response from the survey also indicated an overwhelming percentage (90%) of the students agreed that ICT enhanced their participation and feedback to their teachers whilst 10% disagreed. 94% of the students surveyed agreed that ICT tend to increase students' learning motivation while the remaining 6% disagreed.

Hartman, Moska and Dziuban (2005:6.10-6.12) identified six characteristics that students attribute to the best faculty, what constitutes good teaching appears to be universal across the board.

Students believe that excellent instructors:

- Facilitate student learning
- Communicate ideas and information effectively
- Demonstrate genuine interest in student learning
- Organize their courses effectively
- Show respect and concern for their students
- Assess student progress fairly and effectively

The major emphasis of ICT infusion in pedagogy tends to improve learning, motivate and engage learners, promote collaboration, foster enquiry and exploration, and create a new learner centred learning culture. It permits the move from reproductive model of teaching and learning to an independent, autonomous learning model that promotes initiation, creativity and critical thinking with independent research, Majumdar (2006).

Responses from the survey were in fact consistent with the literature reviewed. Students studying both courses in Business Management and Information Technology agreed that ICT can enhance the interaction between the teacher and student whilst a very small percentage disagreed.

Responses for the question *'What is the extent of teachers' integration of ICT into teaching and learning processes?'* ranged from never to occasionally to frequently to almost always. Students in both areas of study – Business Management and Information Technology - indicated that teachers frequently integrated ICT into teaching and learning processes.

The question *'The frequency of use of ICT on teaching activity'* wanted to gauge from the students the extent of the frequency of the use of ICT on giving instructions to students, communicating with students as well as organizing class discussion, demonstrations and presentations. It also sought to enquire about assessment of students' learning through tests using ICT, if ICT is used to send feedback to students and if ICT is used to support collaboration amongst students. Responses ranged from never to occasionally to frequently to almost always**.**

The students surveyed identified that ICT were used in the various teaching activities considered tied for top of the list as frequently and occasionally, followed by almost always and never placed at the bottom. For the activities of communicating with students and organizing class discussion, demonstrations and presentations it was observed that frequently topped the list and occasionally was second. For giving class instructions frequently tied with occasionally. For the remaining three activities of assessing students' learning through tests, sending feedback to students and supporting collaboration amongst students, the data indicated that occasionally was at the top of the listing while frequently was at number two. For all of the six activities, almost always placed third and never at the bottom of the list.

5.4 OBJECTIVE 3: TO ANALYZE HOW TO DEVELOP POSITIVE ATTITUDES TOWARDS TECHNOLOGY USAGE THAT SUPPORT LIFELONG LEARNING AND COLLABORATION AMONGST STUDENTS

This objective's main purpose was to gauge if positive attitudes were developed towards technology usage that will support lifelong learning and collaboration amongst students.

Students throughout educational institutions consistently mention that several skills are required for their future, including spreadsheet design, graphics design, database setup and web design (McEuen, 2001).

Educational systems around the world are under increasing pressure to use ICTs to teach students the knowledge and skills they require in the 21st century. Designing and implementing successful ICT-enabled teacher education programmes is in fact the key to fundamental, wide ranging educational reform.

According to UNESCO (2009:8), educational changes related to the knowledge deepening approach have more impact on learning as they aim to add value to society and the economy by having learners apply the knowledge of school subjects to solve complex problems encountered in real world situations of work and life. Coordinated teacher professional development would provide teachers with the skills to use more sophisticated methodologies and technologies with changes in the curriculum that emphasise depth of understanding and application of knowledge to real world problems and a pedagogy where the teacher serves as a guide and manager of the learning environment and students are engaged in extended, often collaborative project-based learning activities that can go beyond the classroom.

Hennesey et al (2010) identify the most complex of the three approaches to educational improvement, the knowledge creation approach, aims to increase civic participation, cultural creativity and economic productivity by developing a population that is continuously engaged in and benefits from knowledge creation, innovation, and participation in the learning society. Here, the curriculum goes beyond a focus on knowledge of school subjects to explicitly include the 21st century skills that are needed to create new knowledge and engage in life-long learning—the ability to collaborate, communicate, create, innovate, and think critically. Teacher training coordinates the teachers' sophisticated professional skills with the pervasive use of technology to support students who are creating knowledge products and are engaged in planning and managing their own learning goals in a school that is a continuously improving, learning organisation. Therefore, teachers model the learning process for students and serve as model learners through their own ongoing professional development – individually and collaboratively.

Majumdar (2006) elucidated that the integration of ICT with teaching and learning has produced some of the significant positive gains in learners' knowledge, skills and attitudes by providing the following key advantages:

- Explore and represent information dynamically and in many forms
- Become socially aware and more confident
- Increase motivation
- Communicate effectively about complex processes
- Develop better understanding and broader view of processes and systems
- Greater problem solving and critical thinking skills.

From the responses of the present study, when the *question 'do you agree that ICT tend to increase students' learning motivation'* was analyzed against the category of student learning style, it was found that the majority of students belonging to all four categories of learning styles – reflecting, theorist, pragmatist and the activist - agreed that with the usage of ICT they were motivated to learn. Again, only a small number of students disagreed.

Collaboration amongst students is always important and the use of ICT has further enhanced this collaboration. An overwhelming 92% of the students surveyed agreed that it did indeed enhance their collaboration while a very small percentage disagreed.

When the question – *how has ICT enhanced collaboration amongst students* - was analyzed in the area study it was acknowledged that students studying both courses in Business Management and Information Technology agreed that ICT has in fact enhanced collaboration amongst students studying these courses whilst a very small percentage disagreed and this can be attributed to students not using any form of technological tools.

It was noted that the response patterns of the question *'if ICT has enhanced students' participation and feedback to teachers*' were consistent across the students surveyed irrespective of their age, area of study – whether Business Management or Information Technology, year of study (undergraduate or postgraduate) or option of study (whether they attend full time, part time or Saturday classes). The response indicated that an overwhelming percentage (90%) agreed that ICT has enhanced students' participation and feedback to their teachers whilst a 10% disagreed. For sending feedback to students and supporting collaboration amongst students, the data indicated that occasionally was at the top of the listing while frequently was at number two, never was at the bottom of the listing.

ICTs can enhance critical thinking, information handling skills, high-level conceptualization and problem solving. Since many new technologies are interactive they are already being used extensively to create and sustain a wide range of collaborative processes and activity.

5.5 PROPOSITIONS FROM FINDINGS

5.5.1 PROPOSITION 1: *ICT FOR EDUCATION*

There needs to be a shift from *'Education for ICT'* to the use of ***'ICT for Education'*** and for ICTs to be integrated throughout the curriculum, blending their use with other tools and resources to support student learning.

It involves using ICT to improve teaching and learning. The major emphasis of ICT infusion in pedagogy should be such that it tends to improve learning, motivate and engage learners, promote collaboration, foster enquiry and exploration, and create a new learner centred learning culture.

The classroom learning environment that uses ICT is dependent on both the teacher and the students. The teacher should articulate his/her critical thinking skills which are influenced by his/her attitude towards the usage of ICT in the classroom. The teacher's approach to use of ICT and his/her critical thinking skills in the classroom learning environment would inadvertently influence the students' attitude towards the use of ICT as well as their critical thinking skills in the classroom. This is illustrated by the Figure: Classroom Learning Environment using ICT.

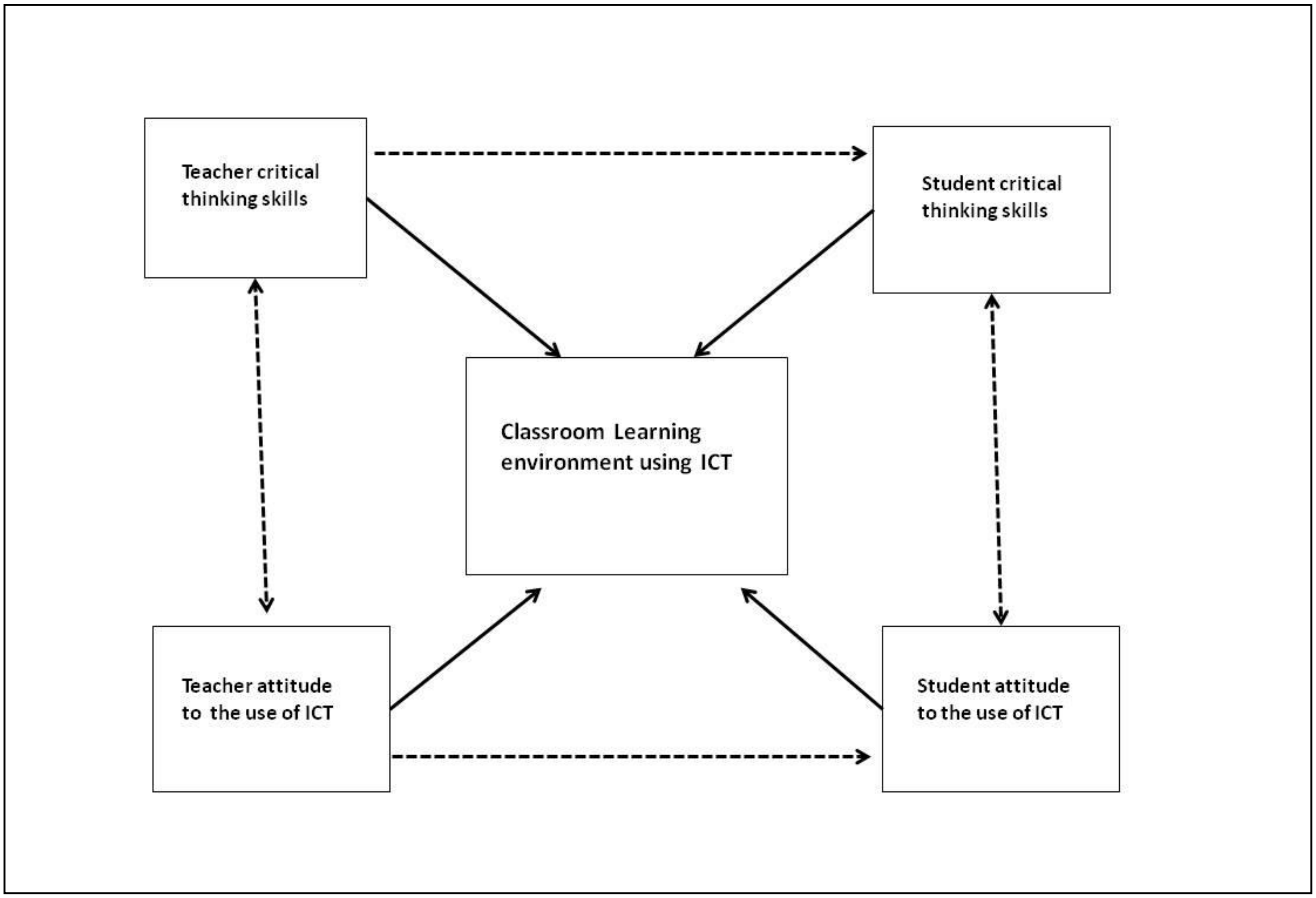


Fig 5.1: Classroom Learning Environment using ICT

5.5.2 PROPOSITION 2: *THE PROMOTION OF ACTIVE AND AUTONOMOUS LEARNING*

The findings from the recent study indicated that students at School of Accounting and Management can be assisted in their critical thinking as well as encouraging positive attitudes towards the usage of ICT by integrating ICT into learning and teaching by:

The promotion of active and autonomous learning

To promote active and autonomous learning in the students by the use of ICT in the learning and teaching process, it is imperative that the teachers give advice, assistance and ask questions of the students that would enable them to search for the necessary information in order to make a decision. Teachers may also want to give students more autonomy in the responsibility of their own learning.

The students may also become more autonomous, independent and self-motivated with respect to their time management. This can be achieved if teachers were to encourage students' self-direction through the usage of ICT during class sessions.

From the teachers' perspective to promote active and autonomous learning in the students by the use of ICT in the learning and teaching process, the teachers would have to take the responsibility to design, plan, organize and provide materials, resources and courses which would integrate ICT into the classroom. For example, a teacher can structure a class session to explain the fundamental theories and concepts of the topic using a Microsoft PowerPoint presentation and subsequently show the relationships of the topic area to real life scenario by the use of examples, which can also be volunteered by the students in the classroom. This further demonstrates that the role of the teacher in the classroom is changing from the traditional lecturer to a guide or a facilitator of the student learning.

5.5.3 PROPOSITION 3: *INCREASING COLLABORATIVE LEARNING*

The results indicated that students studying both courses in Business Management and Information Technology acknowledged that ICT has in fact enhanced collaboration amongst students. The response also indicated an overwhelming percentage (90%) agreed that ICT has enhanced students' participation and feedback to their teachers.

Computer based classroom learning environments can be seen as important to the students in the classroom by motivating the students' interests through group class activities. The students will also be able to share experiences with their classmates as well as exchanging knowledge during class sessions. The teachers, on the other hand can manage the collaborative learning through group sessions and brain storming sessions during class sessions.

With ICT, there are better ways and opportunities to have more realistic learning experiences. ICT encourages interactions, development of collaborative culture, and utilization of active learning and introduction of feedback in proper context. Teachers can also use ICT to bring abstract concepts to life by introducing into the classroom learning environment real world experiences through various medium of simulation, modeling, capturing and analyzing the real event under consideration.

5.5.4 PROPOSITION 4: *ALLOWING STUDENTS TO CONSTRUCT THEIR OWN KNOWLEDGE AND SUBSEQUENTLY SHARING WITH OTHER STUDENTS*

The findings from the research indicated that integrating ICT into the teaching and learning processes enabled students to develop competencies and technological skills which gave them the ability to search for, organize and analyze information and subsequently communicate their ideas adequately using suitable media to their fellow classmates.

Students also expect that their teachers use a variety of multimedia to provide interesting lesson materials. The students also indicated that they expect their teachers to have technological skills and knowledge to teach them to act and also to be able to think critically. As a result, the teachers incorporating ICT in the classroom must therefore be given the opportunity to also develop their technological competencies, professional usage of the current technologies in the market and relevant applications of technology instruction.

With this opportunity for the teachers, students can be given access to different types of information and they can also be introduced to a variety of tools such as databases, search engines (for advanced searches), statistical data analysis software, web development tools. With expertise and the active encouragement of the teachers, the students can subsequently convert the information into knowledge of a personal nature.

5.5.5 PROPOSITION 5: *TEACHERS SHOULD BE PREPARED FOR THEIR ROLE IN THE CLASSROOM*

All teachers involved in the integration of ICT teaching and learning processes should be prepared for their role in the classroom.

Teachers should be provided with the necessary professional learning to support and improve their proficiency as well as their confidence, so as to enable them to plan and subsequently conduct effective lessons which incorporate ICT during class sessions.

Firstly, teachers must be equipped with the fundamentals of ICT tools and sufficient understanding on the integration of these tools in teaching and learning processes and secondly, efforts must be oriented towards changing mind set and developing positive attitudes towards ICT application in teaching and learning.

5.6 CONTRIBUTION TO KNOWLEDGE

In Trinidad and Tobago, where this research was conducted, first and foremost, Trinidad and Tobago, a developing nation will not share the same perspective as that of the developed nations discussed in this literature review. In fact, no such study has been conducted to date in Trinidad and Tobago. Many studies have been done in 1st world nations but this study is the first to be conducted within the Caribbean region.

This study was done in an emerging economy, Trinidad and Tobago, with limitations - innovative methodology to deal with specific limitations of the contextual study.

SAM is different and distinct from other tertiary educational institutions in 1st world nations was used as the case study for this research study. The business management and information technology departments were looked at where future leaders are learning how to create competitive advantage in the various sectors of society.

The findings from this research can also be used in other emerging economies as well as in smaller underdeveloped states in 1st world countries. This model can be used as an auditing tool for existing systems.

Contributing to managerial practice is an integral part of a professional doctorate (Doctorate of Business Administration -DBA). Accordingly, the research design of this thesis takes the importance of practical relevance into consideration.

5.6.1 LEARNING CATEGORY STYLES

All teachers in the tertiary level education system should be cognizant that there is a combination of learners of all four learning category styles – reflecting, theorist, pragmatist and activist – as identified by Kolb (1980) and further worked on and prescribed by Honey and Mumford (2000) found in every classroom. Consequently, the teaching strategies implemented by teachers, regardless of subject areas as identified in this study (Business Management or Information Technology), have to be inclusive of all categories of learners in the teaching process. As the findings from Objective 1 (see Section 5.1) indicate that each learner encapsulates a combination of all four categories of learning throughout his/her experience; however, one category always comes to the forefront whilst learning. As a learner, a student usually would:

1. Have an experience
2. Reflect on an experience

3. Draw one's conclusion (theorize) and
4. Put the theory into practice.

As teachers take into consideration the various learning category styles present in the classroom, their integration of ICT into the teaching and learning process would essentially improve learning, motivate and engage learners, promote collaboration, foster enquiry and exploration and create a new learner centred learning culture.

5.6.2 CRITICAL THINKING SKILLS

Karakaya and Senyapth, 2007; Hirschheim, 2005 as cited by Juang Wang (2008) have identified that the quality of learning can be significantly enhanced when ICTs are approached and utilized to promote dynamic, interactive thinking. ICTs can in fact, enhance critical thinking, information handling skills, high-level conceptualization and problem solving of the students.

Evidence from the findings of the research as seen in Objective 1 (see section 5.1) students brought with them their own set of knowledge content, a variety of thinking skills and their attitudes towards critical thinking into the classroom environment. The factors looked at in the study with regards to the enhancement of critical thinking by use of ICT were analyzing, discriminating, logical reasoning, transforming knowledge, applying standards, information seeking and predicting.

These factors of critical thinking skills must be incorporated into students' practices and pedagogy and curriculum of the area of study which should subsequently enhance the students' critical learning skills through learning activities as well as personal experiences.

Transformation of curriculum from pre-school to tertiary level 'the curriculum at the tertiary level needs to be infused with more ICTs and critical thinking so as to encourage innovation and meaningful transformation in the economy (Trinidad and Tobago Chamber of Industry and Commerce, 2010).

5.6.3 IMPORTANCE OF RESEARCH STUDY

This research study identified that there are a combination of all four learning categories of students - reflecting, theorist, pragmatist and activist – as identified by Kolb (1980) and further worked on and prescribed by Honey and Mumford (2000) found in every classroom. The evidence from this study indicates that each student encapsulates all four learning categories; however, one learning category usually comes to the forefront.

As a consequence, educators at the tertiary level education institutions need to incorporate ICT into the teaching and learning process so as to be inclusive of all categories of learners, as there exists all four categories of learners in each classroom.

How does ICT impact on learners in the classroom and as a consequence how will educators adapt or incorporate ICT in the classroom for the various types of learners?

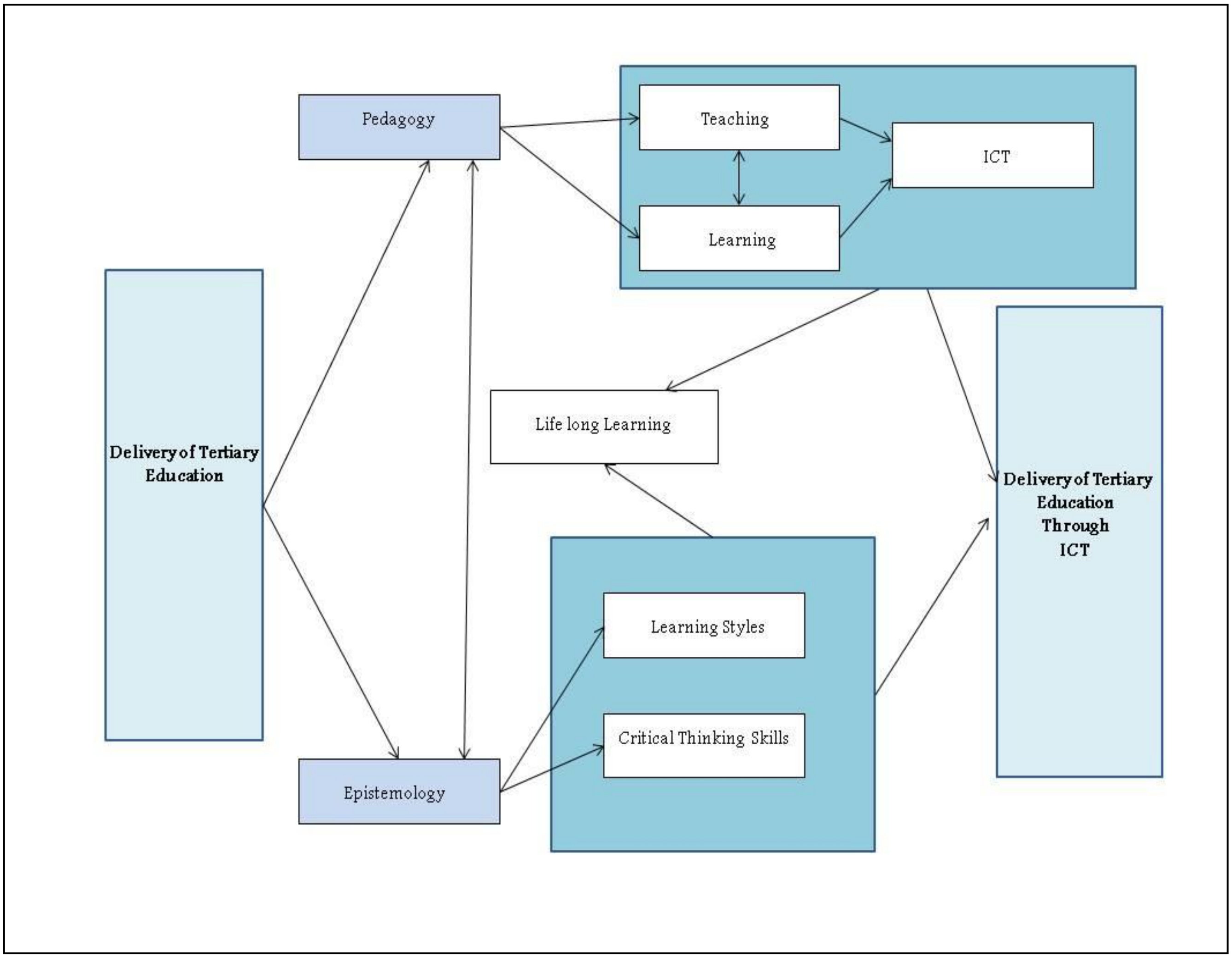


Fig 5.2 Conceptual Framework

The framework developed from this research illustrated the delivery of tertiary education through the use of ICTs can be categorized into pedagogy and epistemology. Pedagogy takes into consideration both teaching and learning which is intrinsically intertwined with ICT whilst epistemology investigates the learning styles of the students as well as their critical thinking skills. Direct output from both epistemology and pedagogy is the lifelong learning of students graduating from tertiary education institution having positive attitudes towards the use of ICT in the workplace.

This framework can also be used in tertiary education institutions in other emerging economies.

5.6.4 TRANSFERABILITY

As articulated in *Chapter 2: Review of Literature*, the model chosen from best practice was the university in the Western Himalayan Region in India, where by the four-tier framework was developed for assessing the initiative, status and performance and impact in the field of ICT in different universities and higher technical institution.

From the findings of my research study, this framework can be tailored to School of Accounting and Management and can be further adapted to the various tertiary educational institutions in Trinidad and Tobago.

The framework is a four tier one where:

- **Tier I** - *the vision and planning*;

  The government of Trinidad and Tobago is committed to tertiary education, TVET and lifelong learning as a national strategy.

  At School of Accounting and Management, the president and founder and the Board of Directors are committed to tertiary education along with lifelong learning, which is aligned to the government's national strategy on tertiary education.

- **Tier II** - *infrastructure including hardware, software, and access to the Internet;*

State of the art equipment along with up to date software are found at School of Accounting and Management.

- **Tier III** – *create knowledge and professionally skilled manpower*

  Evidence from the findings of the research showed that students at university level institution displayed the four learning styles in the classroom with the critical thinking skills incorporated into the students' practices and pedagogy as well as the curriculum of the area of study which would subsequently enhance the students' critical learning skills through learning activities and their personal experiences.

- **Tier IV** - *exhibits the impact of universities at the societal (local) level, at the national and international levels*

  The result of Tier III at the university level is to produce graduates with the general education skills and competencies to serve as the foundation for lifelong learning, including critical, analytical, problem solving and communication skills and also the ability to contribute to community-based development and nation building. These graduates will be integrated into the working population as well as become the leaders of society.

5.7 LIMITATIONS

Meticulous planning of research design as well as exploration of options ensured that the quality of the project was not affected by the potential limitations. In terms of Questionnaire survey, the population sample of this study (N=500), it was considered to be adequate for the statistical procedure conducted to test comparisons and associations. This fact may impact upon the generalisability of the results. Therefore, further research could involve a more diverse sample to include a larger number of students across the area of study, the option of study. It is recommended that this study be replicated by extending the target population.

5.8 DIRECTION FOR FUTURE RESEARCH

Whilst conducting the research especially the literature survey and looking at the Trinidad context, there is scope for further work in some areas outside the research topic.

Firstly, I would propose conducting a longitudinal study, grounded in ethnographic research to investigate how teachers' critical thinking and their attitudes towards ICT, influence teaching strategies and consequently influence students' learning.

Secondly, it would be helpful to conduct further research based on gathering qualitative data from focus groups of both students and teachers. This data collected could provide meaningful insight into the teachers' personal experiences about the usage of ICT in their classrooms in the learning and teaching process at the tertiary level of education. It could also give insight into the students' perception of the use of ICT in the classroom as it relates to the learning process.

Thirdly, I would also suggest further research to ascertain what category of learners better adapts to tertiary education and subsequently what category of learner gets better grades.

Lastly, further research can also look into how culture influences the learning process of students at tertiary level education in Trinidad and Tobago. It could be useful for a deeper understanding of the students approach to learning.

5.9 OVERVIEW

Teaching and learning strategies will not be the same as before as we become increasingly supported by as well as dependant on ICT. We will have to make use of the rich and exciting opportunities offered by the new technologies in education to reach our training goal and mission. One of the intentions of this research paper is to provide a better understanding and appreciation of the role of ICT in teaching and learning at tertiary level education. Several view points of integrating ICT in teaching and learning system have been discussed. Learning is not a transfer of knowledge, rather an active construction. This paradigm shift gives the learners a completely new role that was not earlier described in the transmission model of teaching. Technology and teacher professional development in its use are best introduced in the context of broader educational reform which embraces a shift away from teacher-centred, lecture oriented towards learner centred, interactive and constructive learning environment. ICT can play the role of a catalyst for such educational reforms in the tertiary education sector. The use of ICT is also another method in which a teacher can vary the type of teaching and learning within their lessons, ensuring a positive learning environment is achieved.

This environment will maintain motivation and enthusiasm levels. ICT can promote effective instruction that is more engaging; learner centred, interdisciplinary and more closely related to real life events and processes and adaptive to individual learning styles and needs in the classroom. It also encourages higher order thinking skills and help to construct knowledge socially. Subsequently, teacher professional development in the use of interactive technology should embody and model the forms of pedagogy that teachers can use themselves in their classroom.

The gradual exposure to ICT is yet another method by which the youths of today can become acclimatized to using ICT, in a world where its presence and necessity are ever increasing. Today's university students will be the backbone of tomorrow's society and university education should be committed to seeking knowledge, fostering creative understanding and nurturing their whole personality.

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APPENDIX 1

STUDENT QUESTIONNAIRE

The influence of Information Technology on teaching and learning strategies in the delivery of tertiary education in Trinidad and Tobago

STUDENT QUESTIONNAIRE

SECTION 1: General information

1. Area of study

❑ Business ❑ Information Technology

2. Year of study

❑ Year 1 ❑ Year 2 ❑ Year 3 ❑ MBA ❑ MSc

3. Option of study

❑ Full Time ❑ Part Time ❑ Saturday

4. Age Group

❑ 17–21yrs ❑ 22~26yrs ❑ 27~31yrs ❑32~36yrs ❑ 37~41yrs ❑ 42~46yrs ❑ >46yrs

5. How do you rate your IT skills at the start of your study?

❑ None ❑ Weak ❑ Intermediate ❑ Strong

6. What level are your IT skills at present?

❑ None ❑ Weak ❑ Intermediate ❑ Strong

7. Do you think that your IT skills have improved since starting your studies?

❑ Yes ❑ No

Sections 2 and 3 (Honey and Mumford (2000)) of this survey are designed to help gain an understanding of students learning style so that you can incorporate the various learning styles in your daily learning activities.

Read each statement carefully. There are no correct or incorrect answers. It is best if you do not think about each question too long, as this could lead you to the wrong conclusion.

SECTION 2: Doing & Watching

Circle either **"Doing"** or **"Watching"** next to the statements below, depending upon the part of the statement you most closely relate to.

8. **Doing** - I often produce off-the-cuff ideas that at first might seem silly or half-baked.
   Watching - I am thorough and methodical.

9. **Doing** - I am normally the one who initiates conversations. **Watching** - I enjoy watching people.
10. **Doing** - I am flexible and open minded. **Watching** - I am careful and cautious.
11. **Doing** - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it.
12. **Doing** - I am happy to have a go at new things. **Watching** - I draw up lists up possible courses of actions when starting a new project.
13. **Doing** - I like to get involved and to participate. **Watching** - I like to read and observe.
14. **Doing** - I am loud and outgoing. **Watching** - I am quiet and somewhat shy.
15. **Doing** - I make quick and bold decisions. **Watching** - I make cautious and logical decisions.
16. **Doing** - I speak fast, while thinking. **Watching** - I speak slowly, after thinking.

SECTION 3: Thinking & Feeling

Circle either **"Thinking"** or **"Feeling"** next to the statement below, depending upon the part of the statement you most closely relate to.

16. **Thinking** - I ask probing questions when learning a new subject. **Feeling** - I am good at picking up hints and techniques from other people.
17. **Thinking** - I am rational and logical. **Feeling** - I am practical and down to earth.
18. **Thinking** - I plan events down to the last detail. **Feeling** - I like realistic, but flexible plans.
19. **Thinking** - I like to know the right answers before trying something new. **Feeling** - I try things out by practicing to see if they work.
20. **Thinking** - I analyze reports to find the basic assumptions and inconsistencies. **Feeling** - I rely upon others to give me the basic gist of reports.
21. **Thinking** - I prefer working alone. **Feeling** - I enjoy working with others.
22. **Thinking** - Others would describe me as serious, reserved, and formal. **Feeling** - Others would describe me as verbal, expressive, and informal.
23. **Thinking** - I use facts to make decisions. **Feeling** - I use feelings to make decisions.
24. **Thinking** - I am difficult to get to know. **Feeling** - I am easy to get to know.

SECTION 4: Use of ICT by Students

Tick as many responses as applicable in this section

25. What computer applications do you usually use?

- ❑ MS Excel
- ❑ MS Visio
- ❑ Microsoft Word Processing
- ❑ Customizing Desktop Environment
- ❑ MS PowerPoint
- ❑ Web Publishing
- ❑ MS Project
- ❑ Other ___________________

26. List in order of importance (highest to lowest) your opinion about the use of Information and Communication Technology (ICT) in your learning? ***(1- highest and 10 - lowest)***

	Importance
Use of ICT has an impact on learning process	[ ]
ICT accelerates learning process	[ ]
Use of ICT improves grades	[ ]
Teachers should use ICT during teaching	[ ]
Feel fear from the use of ICT	[ ]
Use of ICT for getting information is better than in the library	[ ]
Know how to use ICT but not interested in using it for learning	[ ]
Getting information from print material is better than using ICT	[ ]
Cannot study without the use of ICT tools	[ ]
Find it time consuming to use ICT in learning	[ ]

27. What do you use the Internet for?

- ❑ Chatting
- ❑ Surfing
- ❑ Email
- ❑ Preparing Presentations
- ❑ Literature Research
- ❑ Social Media
- ❑ Study Purpose
- ❑ Preparing Assignments
- ❑ Online Shopping
- ❑ Playing Games
- ❑ Songs/Movies
- ❑ Other ___________________

28. List the number of hours per week you spend in different online information searching activities?

	Hours
Browsing	[ ]
Scanning Journals	[ ]
Reading Emails	[ ]
Downloading Articles	[ ]
Chatting with friends	[ ]

29. What databases do you use for searching your subject topics?

- ❑ EBSCO
- ❑ Science Direct
- ❑ Springer Link
- ❑ Other ____________________
- ❑ Emerald
- ❑ Cambridge
- ❑ Wikipedia

30. What are some of the problems faced in accessing e Resources?

- ❑ Inadequate PCs
- ❑ Slow internet connectivity
- ❑ Lack of time
- ❑ Electricity failure
- ❑ Lack of support from IT staff
- ❑ Lack of Access
- ❑ Teachers do not use ICT resources during lecture
- ❑ Unwillingness of library staff to help
- ❑ Other _______________________

SECTION 5: Students perception of the Application of ICT in Teaching

31. What critical thinking skills have been enhanced by use of ICT?

- ❑ Analyzing
- ❑ Discriminating
- ❑ Logical Reasoning
- ❑ Transforming Knowledge
- ❑ Applying standards
- ❑ Information Seeking
- ❑ Predicting

32. Does ICT enhance students' skills of

- ❑ grammar
- ❑ punctuation
- ❑ speaking
- ❑ spelling
- ❑ listening
- ❑ reading

❑ writing ❑ Other _______________

33. Do you think that ICT has enhanced students' participation and feedback to teachers?

❑ Agree ❑ Tend to Agree ❑ Tend to Disagree ❑ Disagree

34. Do you think that ICT has enhanced collaboration amongst students?

❑ Agree ❑ Tend to Agree ❑ Tend to Disagree ❑ Disagree

Give examples of collaboration tools used.

____

____

____

____

____

35. Do you agree that ICT can enhance teacher and student interaction?

❑ Agree ❑ Tend to Agree ❑ Tend to Disagree ❑ Disagree

36. Do you agree that ICT tend to increase students' learning motivation?

❑ Agree ❑ Tend to Agree ❑ Tend to Disagree ❑ Disagree

37. What do you perceive as teachers' skills in ICT? *(tick as many as applicable)*

❑ Word Processor ❑ Search Engines
❑ Spreadsheet ❑ Communication
❑ Database ❑ Social Networks

38. What is the extent of teachers' integration of ICT into teaching and learning processes?

❑ Never ❑ Occasionally ❑ Frequently ❑ Almost Always

39. What Hardware used by teachers?

❑ Computer ❑ Smart phone ❑ Multimedia

40. What Software used by Teachers in the classroom?

❑ For word processing ❑ For database
❑ For spreadsheet ❑ For instructional software
❑ For presentation

For the following statements please tick the box that matches your view most closely

41. Frequency of use of ICT on teaching activity:

a. Giving class instructions

❑ Never ❑ Occasionally ❑ Frequently ❑ Almost Always

b. Communicating with students

❑ Never ❑ Occasionally ❑ Frequently ❑ Almost Always

c. Organizing class discussion, demonstrations and presentations

❑ Never ❑ Occasionally ❑ Frequently ❑ Almost Always

d. Assessing students' learning through tests

❑ Never ❑ Occasionally ❑ Frequently ❑ Almost Always

e. Sending feedback to students

❑ Never ❑ Occasionally ❑ Frequently ❑ Almost Always

f. Supporting collaboration amongst students

❑ Never ❑ Occasionally ❑ Frequently ❑ Almost Always

SECTION 6: Institutional ICT Support

42. Ratio of technical ICT support staff to computer labs

❑ Low [1 :9 to 1:6] ❑ Moderate [1:5 to 1:2] ❑ High [1:1]

For the following statements please tick the box that matches your view most closely

43. ICT technical support is efficient

❑ Agree ❑ Tend to Agree ❑ Tend to Disagree ❑ Disagree

44. ICT tasks & problems solved in timely and efficient manner

❑ Agree ❑ Tend to Agree ❑ Tend to Disagree ❑ Disagree

45. What is the extent of technical ICT assistance?

❑ Ongoing support for ICT users

❑ General ICT use in common applications

❑ Hardware

❑ Software

❑ Other ______________________

Thank you for your cooperation

APPENDIX 2

SPSS GRAPHS AND CHARTS

SECTIONS 2 and 3

SECTION 2: DOING AND WATCHING

Sections 2 (Honey and Mumford (2000)) of this survey was designed to help gain an understanding of students' learning style so that an educator can incorporate the various learning styles into students' daily learning activities.

The two variables used for this test were Area of Study and Student Learning.

SL1: Doing - I often produce off-the-cuff ideas that at first might seem silly or half-baked.
Watching - I am thorough and methodical.

Student Learning 1 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 1	Doing	Count	139	112	251
		Expected Count	148.1	102.9	251.0
	Watching	Count	156	93	249
		Expected Count	146.9	102.1	249.0
Total		Count	295	205	500
		Expected Count	295.0	205.0	500.0

Chi-Square Tests

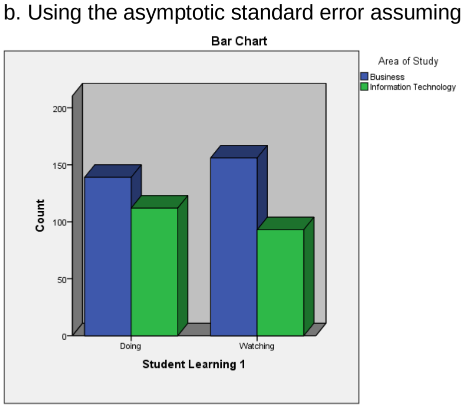
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.733[a]	1	.098
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 102.09.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	-.074	.098
	Cramer's V	.074	.098
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.



χ^2 (1) = 2.733, p =.098; H_0 = accepted

There was no observable difference in responses therefore H_0 has been accepted

SL2: Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people.

Student Learning 2 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 2	Doing	Count	161	92	253
		Expected Count	149.3	103.7	253.0
	Watching	Count	134	113	247
		Expected Count	145.7	101.3	247.0
Total		Count	295	205	500
		Expected Count	295.0	205.0	500.0

Chi-Square Tests

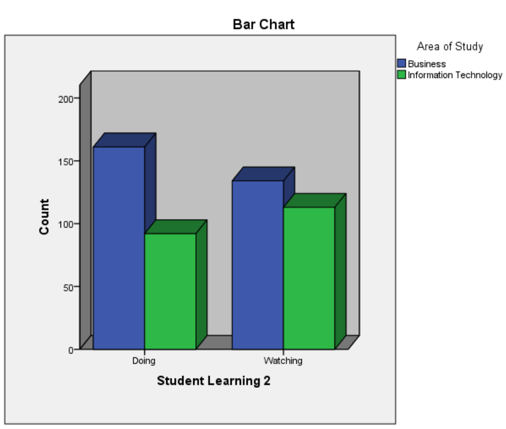
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.551[a]	1	.033
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 101.27.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.095	.033
	Cramer's V	.095	.033
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.



SL3: Doing - I am flexible and open minded. **Watching** - I am careful and cautious.

Student Learning 3 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 3	Doing	Count	198	150	348
		Expected Count	205.3	142.7	348.0
	Watching	Count	97	55	152
		Expected Count	89.7	62.3	152.0
Total		Count	295	205	500
		Expected Count	295.0	205.0	500.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.094[a]	1	.148
N of Valid Cases	500		

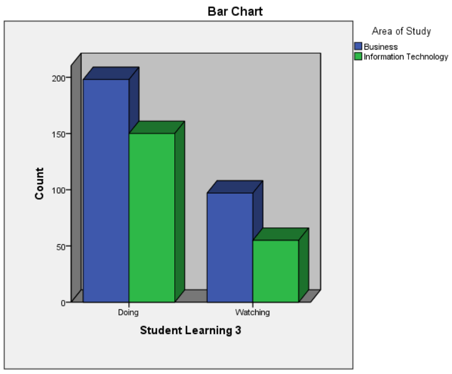
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 62.32.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	-.065	.148
	Cramer's V	.065	.148
N of Valid Cases		500	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.



SL4: Doing - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it.

Student Learning 4 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 4	Doing	Count	154	92	246
		Expected Count	145.1	100.9	246.0
	Watching	Count	141	113	254
		Expected Count	149.9	104.1	254.0
Total		Count	295	205	500
		Expected Count	295.0	205.0	500.0

Chi-Square Tests

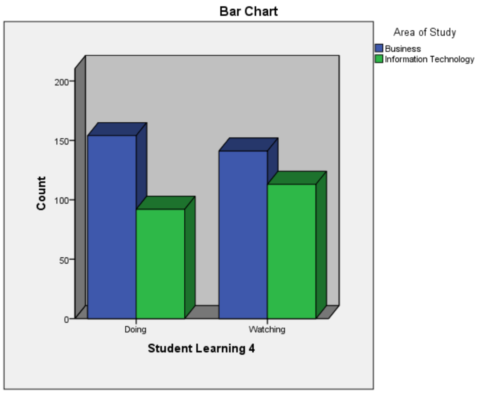
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.597[a]	1	.107
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 100.86.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.072	.107
	Cramer's V	.072	.107
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.



SL5: Doing - I am happy to have a go at new things. **Watching** - I draw up lists up possible courses of actions when starting a new project.

Student Learning 5 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 5	Doing	Count	175	132	307
		Expected Count	181.1	125.9	307.0
	Watching	Count	120	73	193
		Expected Count	113.9	79.1	193.0
Total		Count	295	205	500
		Expected Count	295.0	205.0	500.0

Chi-Square Tests

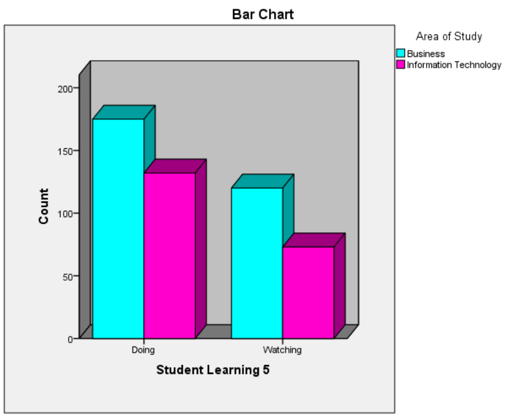
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.311[a]	1	.252
Continuity Correction[b]	1.106	1	.293
N of Valid Cases	500		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 79.13.
b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	-.051	.252
	Cramer's V	.051	.252
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.



SL6: Doing - I like to get involved and to participate. **Watching** - I like to read and observe.

Student Learning 6 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 6	Doing	Count	188	116	304
		Expected Count	179.4	124.6	304.0
	Watching	Count	107	89	196
		Expected Count	115.6	80.4	196.0
Total		Count	295	205	500
		Expected Count	295.0	205.0	500.0

Chi-Square Tests

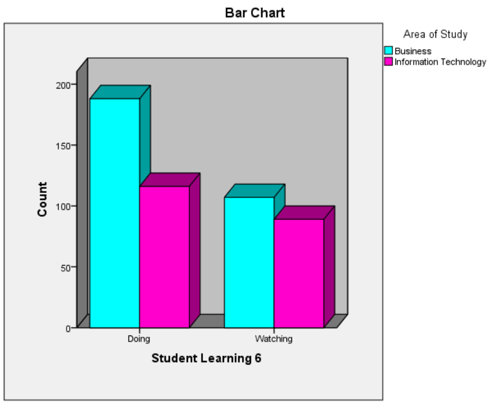
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.590[a]	1	.108
Continuity Correction[b]	2.299	1	.129
N of Valid Cases	500		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 80.36.
b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.072	.108
	Cramer's V	.072	.108
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.



SL7: Doing - I am loud and outgoing. **Watching** - I am quiet and somewhat shy.

Student Learning 7 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 7	Doing	Count	132	70	202
		Expected Count	119.2	82.8	202.0
	Watching	Count	163	135	298
		Expected Count	175.8	122.2	298.0
Total		Count	295	205	500
		Expected Count	295.0	205.0	500.0

Chi-Square Tests

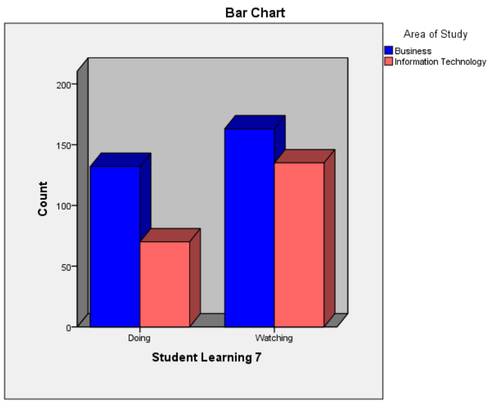
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.643[a]	1	.018
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 82.82.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.106	.018
	Cramer's V	.106	.018
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.



SL8: Doing - I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

Student Learning 8 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 8	Doing	Count	75	38	113
		Expected Count	66.7	46.3	113.0
	Watching	Count	220	167	387
		Expected Count	228.3	158.7	387.0
Total		Count	295	205	500
		Expected Count	295.0	205.0	500.0

Chi-Square Tests

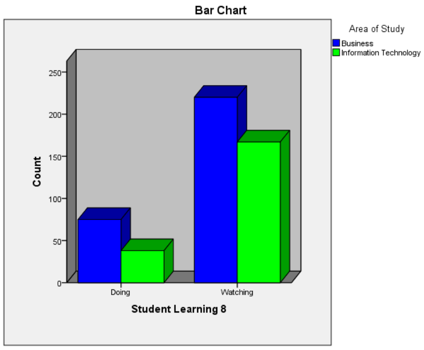
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.280[a]	1	.070
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 46.33.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.081	.070
	Cramer's V	.081	.070
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.



			Area of Study		Total
			Business	Information Technology	
Student Learning 8	Doing	Count	75	38	113
	Watching	Count	220	167	387
Total		Count	295	205	500

SL9: Doing - I speak fast, while thinking. **Watching** - I speak slowly, after thinking.

Student Learning 9 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 9	Doing	Count	164	109	273
		Expected Count	161.1	111.9	273.0
	Watching	Count	131	96	227
		Expected Count	133.9	93.1	227.0
Total		Count	295	205	500
		Expected Count	295.0	205.0	500.0

Chi-Square Tests

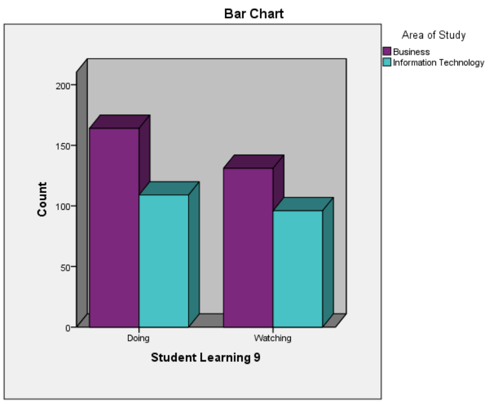
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.286[a]	1	.593
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 93.07.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.024	.593
	Cramer's V	.024	.593
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.



			Area of Study		Total
			Business	Information Technology	
Student Learning 9	Doing	Count	164	109	273
	Watching	Count	131	96	227
Total		Count	295	205	500

SECTION 3:

SL10: Thinking - I ask probing questions when learning a new subject. **Feeling** - I am good at picking up hints and techniques from other people.

Student Learning 10 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 10	Thinking	Count	140	89	229
		Expected Count	135.1	93.9	229.0
	Feeling	Count	155	116	271
		Expected Count	159.9	111.1	271.0
Total		Count	295	205	500
		Expected Count	295.0	205.0	500.0

Chi-Square Tests

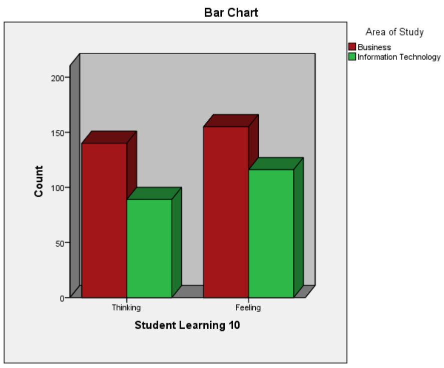
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.796[a]	1	.372
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 93.89.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.040	.372
	Cramer's V	.040	.372
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.



			Area of Study		Total
			Business	Information Technology	
Student Learning 10	Thinking	Count	140	89	229
	Feeling	Count	155	116	271
Total		Count	295	205	500

SL11: Thinking - I am rational and logical. **Feeling** - I am practical and down to earth.

Student Learning 11 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 11	Thinking	Count	102	91	193
		Expected Count	113.9	79.1	193.0
	Feeling	Count	193	114	307
		Expected Count	181.1	125.9	307.0
Total		Count	295	205	500
		Expected Count	295.0	205.0	500.0

Chi-Square Tests

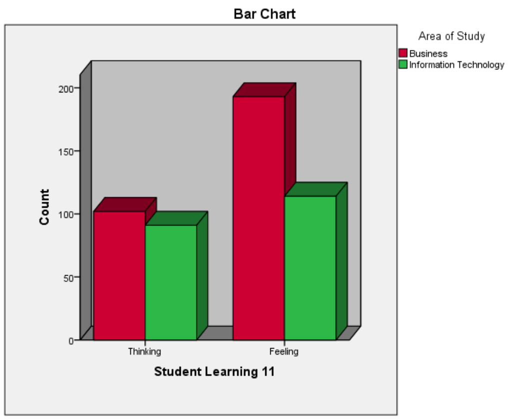
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.915[a]	1	.027
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 79.13.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	-.099	.027
	Cramer's V	.099	.027
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.



Student Learning 11 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 11	Thinking	Count	102	91	193
	Feeling	Count	193	114	307
Total		Count	295	205	500

SL12: Thinking - I plan events down to the last detail. **Feeling** - I like realistic, but flexible plans.

Student Learning 12 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 12	Thinking	Count	113	42	155
		Expected Count	91.5	63.6	155.0
	Feeling	Count	182	163	345
		Expected Count	203.6	141.5	345.0
Total		Count	295	205	500

	Expected Count	295.0	205.0	500.0

Chi-Square Tests

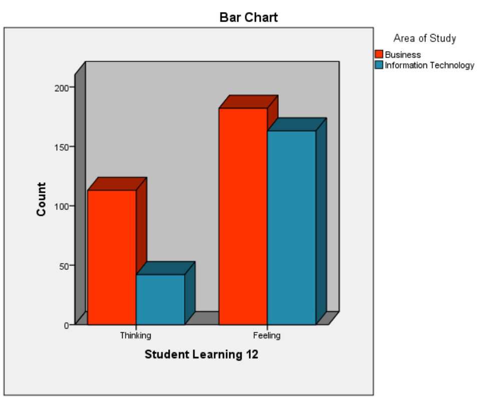
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.951[a]	1	.000
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 63.55.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.189	.000
	Cramer's V	.189	.000
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.



Student Learning 12 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 12	Thinking	Count	113	42	155
	Feeling	Count	182	163	345
Total		Count	295	205	500
				205.0	500.0

SL13: Thinking - I like to know the right answers before trying something new. **Feeling** - I try things out by practicing to see if they work.

Student Learning 13 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 13	Thinking	Count	155	84	239
		Expected Count	141.0	98.0	239.0
	Feeling	Count	140	121	261
		Expected Count	154.0	107.0	261.0
Total		Count	295	205	500
		Expected Count	295.0	205.0	500.0

Chi-Square Tests

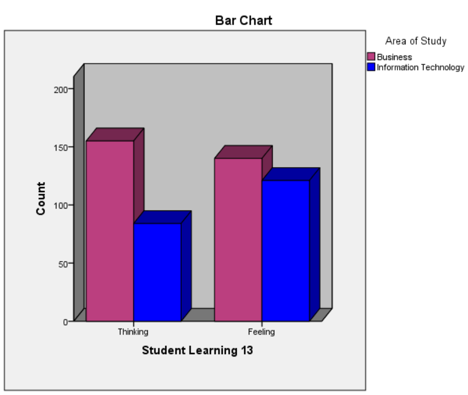
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.485[a]	1	.011
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 97.99.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.114	.011
	Cramer's V	.114	.011
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.



Student Learning 13 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 13	Thinking	Count	155	84	239
	Feeling	Count	140	121	261

Total	Count	295	205	500

SL14: Thinking - I analyze reports to find the basic assumptions and inconsistencies. **Feeling** - I rely upon others to give me the basic gist of reports.

Student Learning 14 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 14	Thinking	Count	225	162	387
		Expected Count	228.3	158.7	387.0
	Feeling	Count	70	43	113
		Expected Count	66.7	46.3	113.0
Total		Count	295	205	500
		Expected Count	295.0	205.0	500.0

Chi-Square Tests

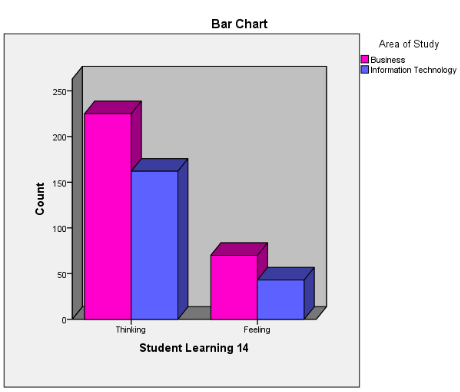
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.524[a]	1	.469
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 46.33.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	-.032	.469
	Cramer's V	.032	.469
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.



Student Learning 14 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 14	Thinking	Count	225	162	387
	Feeling	Count	70	43	113
Total		Count	295	205	500

SL15: Thinking - I prefer working alone. **Feeling** - I enjoy working with others.

Student Learning 15 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 15	Thinking	Count	180	111	291
		Expected Count	171.7	119.3	291.0
	Feeling	Count	115	94	209
		Expected Count	123.3	85.7	209.0
Total		Count	295	205	500
		Expected Count	295.0	205.0	500.0

Chi-Square Tests

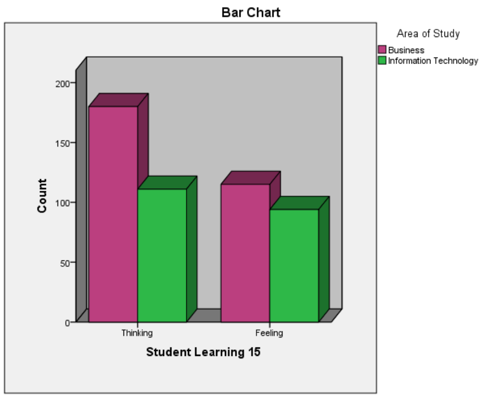
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.347[a]	1	.126
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 85.69.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.069	.126
	Cramer's V	.069	.126
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.



Student Learning 15 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 15	Thinking	Count	180	111	291
	Feeling	Count	115	94	209
Total		Count	295	205	500

SL16: Thinking - Others would describe me as serious, reserved, and formal. **Feeling** - Others would describe me as verbal, expressive, and informal.

Student Learning 16 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 16	Thinking	Count	161	102	263
		Expected Count	155.2	107.8	263.0
	Feeling	Count	134	103	237
		Expected Count	139.8	97.2	237.0
Total		Count	295	205	500
		Expected Count	295.0	205.0	500.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.127[a]	1	.288
N of Valid Cases	500		

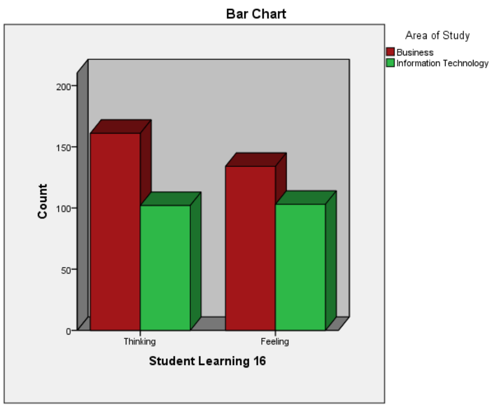
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 97.17.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.047	.288

	Cramer's V	.047	.288
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.



Student Learning 16 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 16	Thinking	Count	161	102	263
	Feeling	Count	134	103	237
Total		Count	295	205	500

SL17: Thinking - I use facts to make decisions. **Feeling** - I use feelings to make decisions.

Student Learning 17 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 17	Thinking	Count	224	161	385
		Expected Count	227.2	157.9	385.0
	Feeling	Count	71	44	115
		Expected Count	67.9	47.2	115.0
Total		Count	295	205	500
		Expected Count	295.0	205.0	500.0

Chi-Square Tests

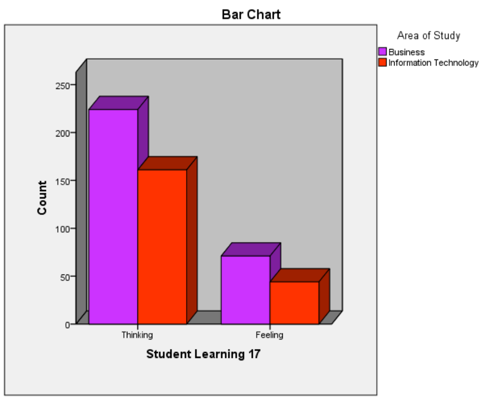
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.463[a]	1	.496
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 47.15.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	-.030	.496
	Cramer's V	.030	.496
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.



Student Learning 17 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 17	Thinking	Count	224	161	385
	Feeling	Count	71	44	115
Total		Count	295	205	500

SL18: Thinking - I am difficult to get to know. **Feeling** - I am easy to get to know.

Student Learning 18 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 18	Thinking	Count	99	58	157
		Expected Count	92.6	64.4	157.0
	Feeling	Count	196	147	343
		Expected Count	202.4	140.6	343.0
Total		Count	295	205	500
		Expected Count	295.0	205.0	500.0

Chi-Square Tests

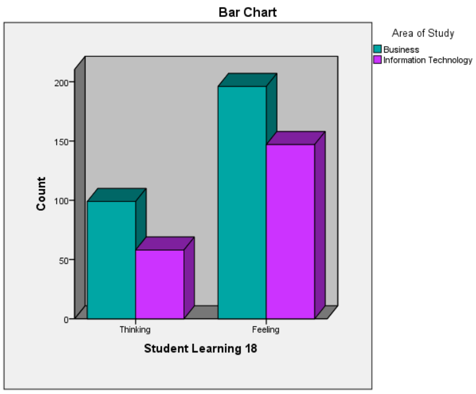
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.557[a]	1	.212
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 64.37.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.056	.212
	Cramer's V	.056	.212
N of Valid Cases		500	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.



Student Learning 18 * Area of Study Crosstabulation

			Area of Study		Total
			Business	Information Technology	
Student Learning 18	Thinking	Count	99	58	157
	Feeling	Count	196	147	343
Total		Count	295	205	500

Student Learning 1(SL1): Doing - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical.

In the survey conducted 50.2% of students were SL1 (**Doing** - I often produce off-the-cuff ideas that at first might seem silly or half-baked thinking whilst 49.8% were feeling **Watching** - I am thorough and methodical) at the present time of their study. These differences were significant therefore H_0 has been rejected.

χ^2 (4) = 13.791, p =0.008; H_0 = rejected

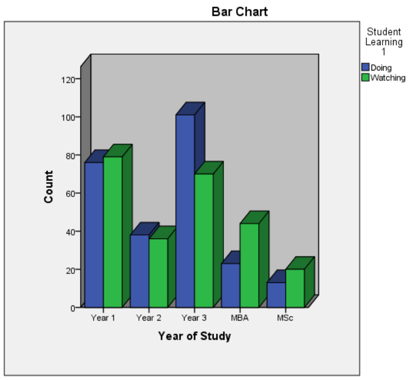


Figure 5: Year of Study and SL1

Year of Study * Student Learning 1

		Student Learning 1		Total
		Doing	Watching	
	Year 1	76	79	155
	Year 2	38	36	74
Year of Study	Year 3	101	70	171
	MBA	23	44	67
	MSc	13	20	33
Total		251	249	500

		Frequency	Percent
	Doing	251	50.2
Valid	Watching	249	49.8
	Total	500	100.0

Student Learning 2 (SL2): Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people.

In the survey conducted 50.6% of students were SL2 (**Doing** - I am normally the one who initiates conversations whilst 49.4% were feeling **Watching** - I enjoy watching people) at the present time of their study. These differences were not significant therefore H_0 has been accepted

χ^2 (4) = 5.703, p =0.222; H_0 = accepted

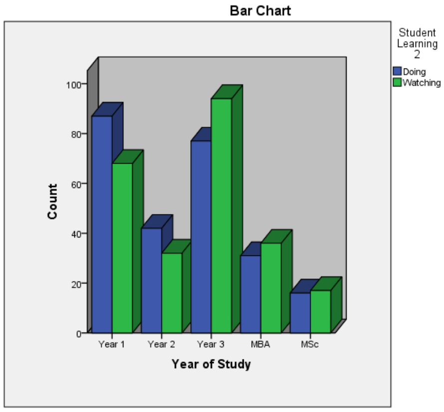


Figure 6: Year of Study and SL2

Year of Study * Student Learning 2 Crosstabulation

Count

		Student Learning 2		Total
		Doing	Watching	
Year of Study	Year 1	87	68	155
	Year 2	42	32	74
	Year 3	77	94	171
	MBA	31	36	67
	MSc	16	17	33
Total		253	247	500

		Frequency	Percent
Valid	Doing	253	50.6
	Watching	247	49.4
	Total	500	100.0

Student Learning 3 (SL3): Doing - I am flexible and open minded. **Watching** - I am careful and cautious.

The two variables used for this test were Year of Study and SL3 as stated above

SL3 (**Doing** - I am flexible and open minded. **Watching** - I am careful and cautious) and the year of study.

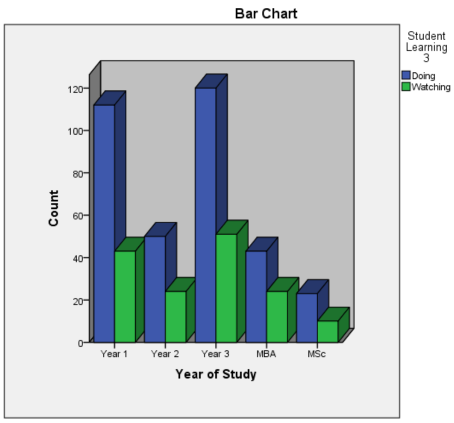


Figure 7: Year of Study and SL3

Year of Study * Student Learning 3

Count

		Student Learning 3		Total
		Doing	Watching	
Year of Study	Year 1	112	43	155
	Year 2	50	24	74
	Year 3	120	51	171
	MBA	43	24	67
	MSc	23	10	33
Total		348	152	500

		Frequency	Percent
Valid	Doing	348	69.6
	Watching	152	30.4
	Total	500	100.0

Student Learning 4 (SL4): Doing - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it.

The two variables used for this test were Year of Study and SL3 as stated above

SL4 (**Doing** - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it) and the year of study, it is very low.

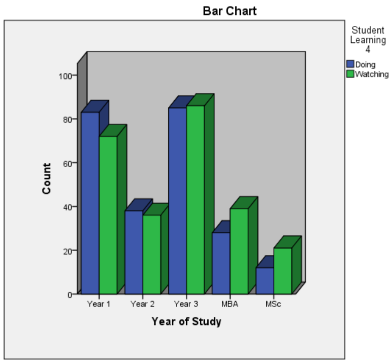


Figure 8: Year of Study and SL4

Year of Study * Student Learning 4

Count

		Student Learning 4		Total
		Doing	Watching	
Year of Study	Year 1	83	72	155
	Year 2	38	36	74
	Year 3	85	86	171
	MBA	28	39	67
	MSc	12	21	33
Total		246	254	500

		Frequency	Percent
Valid	Doing	246	49.2
	Watching	254	50.8
	Total	500	100.0

Student Learning 5 (SL5): Doing - I am happy to have a go at new things. **Watching** - I am happy to have a go at new things

The two variables used for this test were Year of Study and SL5 as stated above.

SL5 d**oing** - I am happy to have a go at new things. **Watching** - I draw up lists of possible courses of actions when starting a new project) and the year of study

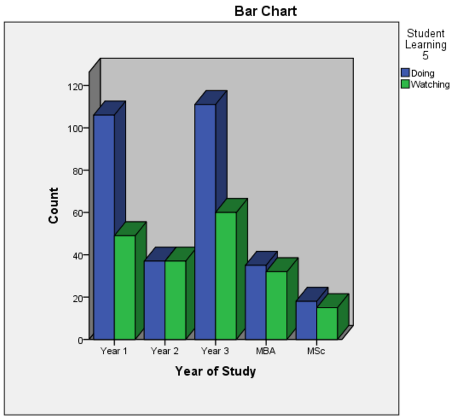


Figure 9: Year of Study and SL5

Year of Study * Student Learning 5

Count

		Student Learning 5		Total
		Doing	Watching	
Year of Study	Year 1	106	49	155
	Year 2	37	37	74
	Year 3	111	60	171
	MBA	35	32	67
	MSc	18	15	33
Total		307	193	500

		Frequency	Percent
Valid	Doing	307	61.4
	Watching	193	38.6
	Total	500	100.0

Student Learning 6 (SL6): Doing - I like to get involved and to participate. **Watching** - I like to read and observe.

The two variables used for this test were Year of Study and SL6 as stated above.

The variable SL6 (**Doing** - I like to get involved and to participate. **Watching** - I like to read and observe)

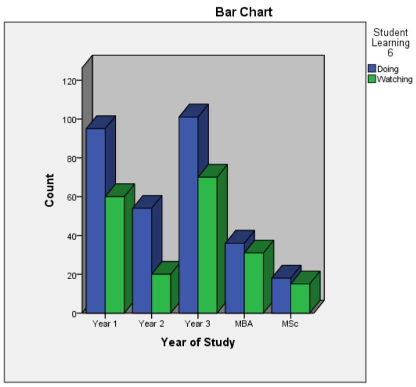


Figure 10: Year of Study and SL6

Year of Study * Student Learning 6

Count

		Student Learning 6		Total
		Doing	Watching	
Year of Study	Year 1	95	60	155
	Year 2	54	20	74
	Year 3	101	70	171
	MBA	36	31	67
	MSc	18	15	33
Total		304	196	500

		Frequency	Percent
Valid	Doing	304	60.8
	Watching	196	39.2
	Total	500	100.0

Student Learning 7 (SL7): Doing - I am loud and outgoing. **Watching** - I am quiet and somewhat shy.

The two variables used for this test were Year of Study and SL7 as stated above.

SL7 (**Doing** - I am loud and outgoing. **Watching** - I am quiet and somewhat shy) and the year of study.

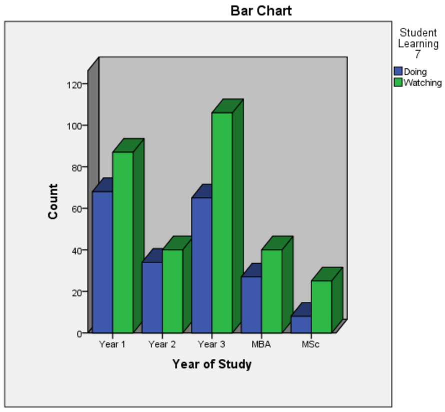


Figure 11: Year of Study and SL7

Year of Study * Student Learning 7 Crosstabulation

Count

		Student Learning 7		Total
		Doing	Watching	
Year of Study	Year 1	68	87	155
	Year 2	34	40	74
	Year 3	65	106	171
	MBA	27	40	67
	MSc	8	25	33
Total		202	298	500

		Frequency	Percent
Valid	Doing	202	40.4
	Watching	298	59.6
	Total	500	100.0

Student Learning 8 (SL8): Doing - I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

The two variables used for this test were Year of Study and SL8 as stated above.

SL8 (**Doing** - I make quick and bold decisions. **Watching** - I make cautious and logical decisions) and the year of study.

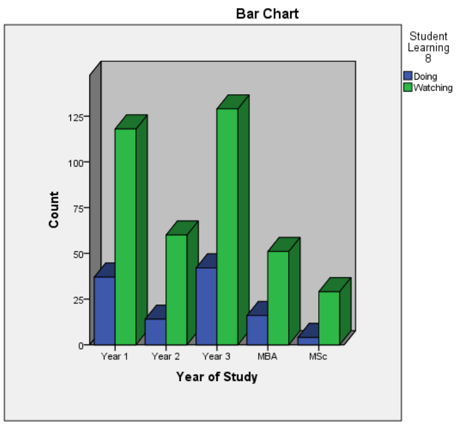


Figure 12: Year of Study and SL8

Year of Study * Student Learning 8

Count

		Student Learning 8		Total
		Doing	Watching	
Year of Study	Year 1	37	118	155
	Year 2	14	60	74
	Year 3	42	129	171
	MBA	16	51	67
	MSc	4	29	33
Total		113	387	500

		Frequency	Percent
Valid	Doing	113	22.6
	Watching	387	77.4
	Total	500	100.0

Student Learning 9 (SL9): Doing - I speak fast, while thinking. **Watching** - I speak slowly, after thinking.

The two variables used for this test were Year of Study and SL9 as stated above.

SL9 (**Doing** - I speak fast, while thinking. **Watching** - I speak slowly, after thinking) and the year of study

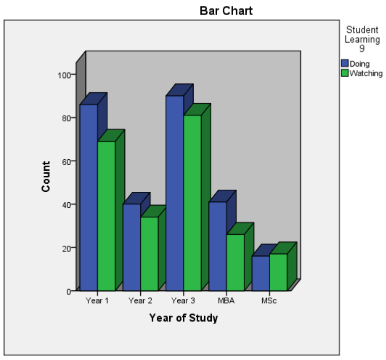


Figure 13: Year of Study and SL9

Year of Study * Student Learning 9

Count

		Student Learning 9		Total
		Doing	Watching	
Year of Study	Year 1	86	69	155
	Year 2	40	34	74
	Year 3	90	81	171
	MBA	41	26	67
	MSc	16	17	33
Total		273	227	500

		Frequency	Percent
Valid	Doing	273	54.6
	Watching	227	45.4
	Total	500	100.0

SECTION 3: Thinking and Feeling

Sections 3 (Honey and Mumford (2000)) of this survey was designed to help gain an understanding of students learning style so that an educator can incorporate the various learning styles in students' daily learning activities.

Student Learning 10 (SL10): Thinking - I ask probing questions when learning a new subject. **Feeling** - I am good at picking up hints and techniques from other people.

The two variables used for this test were Year of Study and SL10 as stated above.

SL10 (**Thinking** - I ask probing questions when learning a new subject. **Feeling** - I am good at picking up hints and techniques from other people) and the year of study

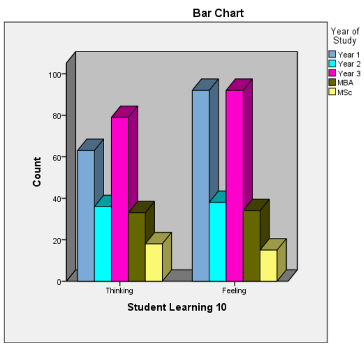


Figure 14: Year of Study and SL10

Year of Study * Student Learning 10 Crosstabulation

Count

		Student Learning 10		Total
		Thinking	Feeling	
Year of Study	Year 1	63	92	155
	Year 2	36	38	74
	Year 3	79	92	171
	MBA	33	34	67
	MSc	18	15	33
Total		229	271	500

		Frequency	Percent
Valid	Thinking	229	45.8
	Feeling	271	54.2
	Total	500	100.0

Student Learning 11 (SL11): Thinking - I am rational and logical. **Feeling** - I am practical and down to earth.

The two variables used for this test were Year of Study and SL11 as stated above.

SL11 (**Thinking** - I am rational and logical. **Feeling** - I am practical and down to earth) and the year of study

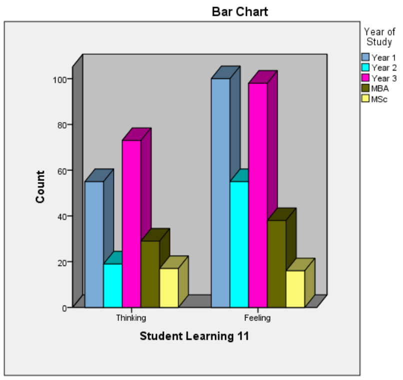


Figure 15: Year of Study and SL11

Year of Study * Student Learning 11

Count

		Student Learning 11		Total
		Thinking	Feeling	
Year of Study	Year 1	55	100	155
	Year 2	19	55	74
	Year 3	73	98	171
	MBA	29	38	67
	MSc	17	16	33
Total		193	307	500

		Frequency	Percent
Valid	Thinking	193	38.6
	Feeling	307	61.4
	Total	500	100.0

Student Learning 12 (SL12): Thinking - I plan events down to the last detail. **Feeling** - I like realistic, but flexible plans.

The two variables used for this test were Year of Study and SL12 as stated above.

SL12 (**Thinking** - I plan events down to the last detail. **Feeling** - I like realistic, but flexible plans) and the year of study

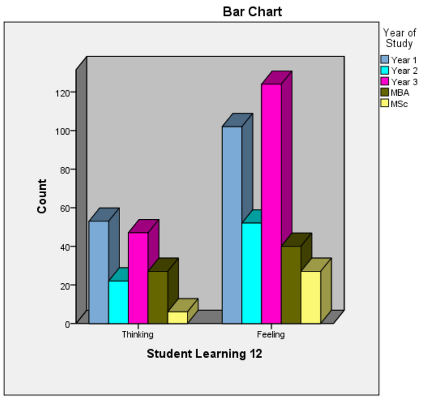


Figure 16: Year of Study and SL12

Year of Study * Student Learning 12

		Student Learning 12		Total
		Thinking	Feeling	
Year of Study	Year 1	53	102	155
	Year 2	22	52	74
	Year 3	47	124	171
	MBA	27	40	67
	MSc	6	27	33
Total		155	345	500

		Frequency	Percent
Valid	Thinking	155	31.0
	Feeling	345	69.0
	Total	500	100.0

Student Learning 13 (SL13): Thinking - I like to know the right answers before trying something new. **Feeling** - I try things out by practicing to see if they work.

The two variables used for this test were Year of Study and SL13 as stated above.

SL13 (**Thinking** - I like to know the right answers before trying something new. **Feeling** - I try things out by practicing to see if they work) and the year of study

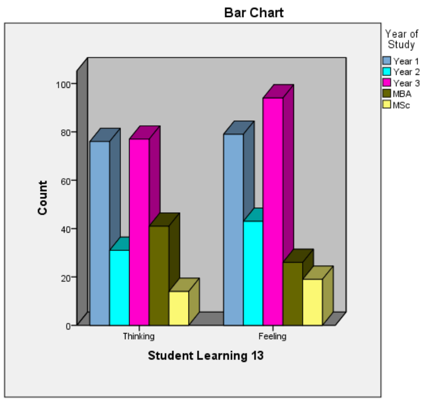


Figure 17: Year of Study and SL13

Year of Study * Student Learning 13

Count

		Student Learning 13		Total
		Thinking	Feeling	
	Year 1	76	79	155
	Year 2	31	43	74
Year of Study	Year 3	77	94	171
	MBA	41	26	67
	MSc	14	19	33
Total		239	261	500

		Frequency	Percent
	Thinking	239	47.8
Valid	Feeling	261	52.2
	Total	500	100.0

Student Learning 14 (SL14): Thinking - I analyze reports to find the basic assumptions and inconsistencies. **Feeling** - I rely upon others to give me the basic gist of reports.

The two variables used for this test were Year of Study and SL14 as stated above.

SL14 (**Thinking** - I analyze reports to find the basic assumptions and inconsistencies. **Feeling** - I rely upon others to give me the basic gist of reports) and the year of study

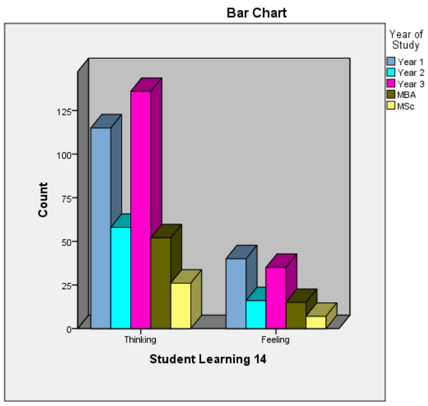


Figure 18: Year of Study and SL14

Year of Study * Student Learning 14 Crosstabulation

Count

		Student Learning 14		Total
		Thinking	Feeling	
Year of Study	Year 1	115	40	155
	Year 2	58	16	74
	Year 3	136	35	171
	MBA	52	15	67
	MSc	26	7	33
Total		387	113	500

		Frequency	Percent
Valid	Thinking	387	77.4
	Feeling	113	22.6
	Total	500	100.0

Student Learning 15 (SL15): **Thinking** - I prefer working alone. **Feeling** - I enjoy working with others.

The two variables used for this test were Year of Study and SL15 as stated above.

SL15 (**Thinking** - I prefer working alone. **Feeling** - I enjoy working with others) and the year of study

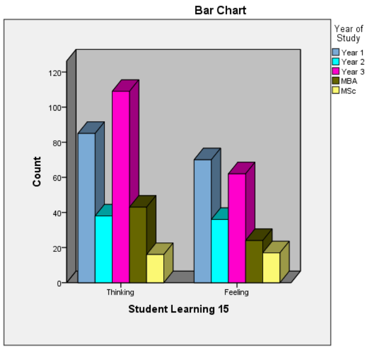


Figure 19: Year of Study and SL15

Year of Study * Student Learning 15

		Student Learning 15		Total
		Thinking	Feeling	
Year of Study	Year 1	85	70	155
	Year 2	38	36	74
	Year 3	109	62	171
	MBA	43	24	67
	MSc	16	17	33
Total		291	209	500

		Frequency	Percent
Valid	Thinking	291	58.2
	Feeling	209	41.8
	Total	500	100.0

Student Learning 16 (SL16): Thinking - Others would describe me as serious, reserved, and formal. **Feeling** - Others would describe me as verbal, expressive, and informal.

The two variables used for this test were Year of Study and SL16 as stated above.

SL16 (**Thinking** - Others would describe me as serious, reserved, and formal. **Feeling** - Others would describe me as verbal, expressive, and informal) and the year of study

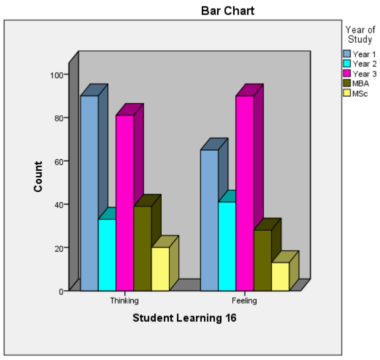


Figure 20: Year of Study and SL16

Year of Study * Student Learning 16

Count

		Student Learning 16		Total
		Thinking	Feeling	
Year of Study	Year 1	90	65	155
	Year 2	33	41	74
	Year 3	81	90	171
	MBA	39	28	67
	MSc	20	13	33
Total		263	237	500

		Frequency	Percent
Valid	Thinking	263	52.6
	Feeling	237	47.4
	Total	500	100.0

Student Learning 17 (SL17): **Thinking** - I use facts to make decisions. **Feeling** - I use feelings to make decisions.

The two variables used for this test were Year of Study and SL17 as stated above.

SL17 (**Thinking** - I use facts to make decisions. **Feeling** - I use feelings to make decisions) and the year of study

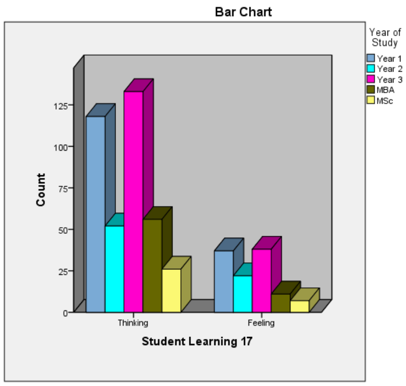


Figure 21: Year of Study and SL17

Year of Study * Student Learning 17

		Student Learning 17		Total
		Thinking	Feeling	
Year of Study	Year 1	118	37	155
	Year 2	52	22	74
	Year 3	133	38	171
	MBA	56	11	67
	MSc	26	7	33
Total		385	115	500

		Frequency	Percent
Valid	Thinking	385	77.0
	Feeling	115	23.0
	Total	500	100.0

Student Learning 18 (SL18): **Thinking** - I am difficult to get to know. **Feeling** - I am easy to get to know.

The two variables used for this test were Year of Study and SL18 as stated above.

SL18 (**Thinking** - I am difficult to get to know. **Feeling** - I am easy to get to know) and the year of study

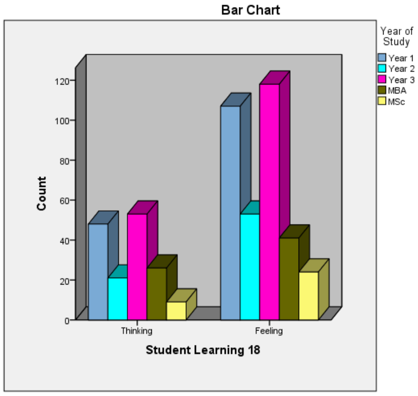


Figure 22: Year of Study and SL18

Year of Study * Student Learning 18

		Student Learning 18		Total
		Thinking	Feeling	
Year of Study	**Year 1**	48	107	**155**
	Year 2	21	53	**74**
	Year 3	53	118	**171**
	MBA	26	41	**67**
	MSc	9	24	**33**
Total		157	343	**500**

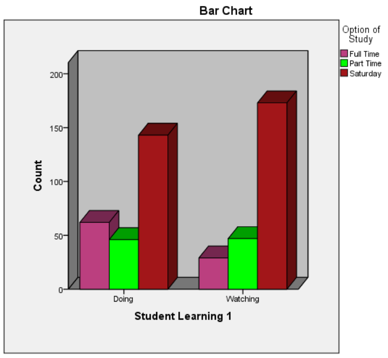
		Frequency	Percent
Valid	Thinking	157	31.4
	Feeling	343	68.6
	Total	500	100.0

The two variables used for this test were Option of Study and Student Learning.

SL1: Doing - I often produce off-the-cuff ideas that at first might seem silly or half-baked.
Watching - I am thorough and methodical.

Student Learning 1 * Option of Study

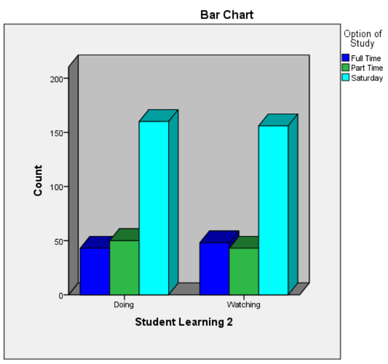
			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 1	**Doing**	Count	62	46	143	251
		% within Option of Study	68.1%	49.5%	45.3%	50.2%
	Watching	Count	29	47	173	249
		% within Option of Study	31.9%	50.5%	54.7%	49.8%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%



In the survey conducted 50.2% of students were **doing** (I often produce off-the-cuff ideas that at first might seem silly or half-baked) whilst 49.8% were **watching** (I am thorough and methodical) at the present time of their study. There is observable difference in the responses therefore H_0 has been rejected

χ^2 (2) = 14.818.p =.001. H_0 = rejected

SL2: Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people



Student Learning 2 * Option of Study Crosstabulation

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 2	Doing	Count	43	50	160	253
		% within Option of Study	47.3%	53.8%	50.6%	50.6%
	Watching	Count	48	43	156	247
		% within Option of Study	52.7%	46.2%	49.4%	49.4%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%

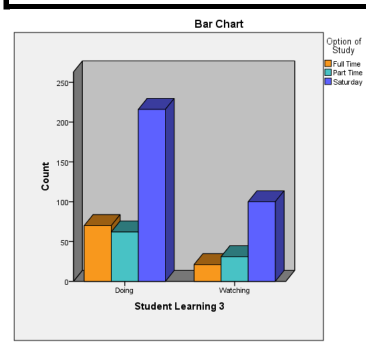
In the survey conducted 50.6% of students were **Doing** - I am normally the one who initiates conversations whilst 49.4% were **Watching** - I enjoy watching people, at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (2) = 0.780.p =.677; H_0 = accepted

SL3: Doing - I am flexible and open minded. **Watching** - I am careful and cautious.

Student Learning 3 * Option of Study Crosstabulation

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 3	Doing	Count	70	62	216	**348**
		% within Option of Study	76.9%	66.7%	68.4%	**69.6%**
	Watching	Count	21	31	100	**152**
		% within Option of Study	23.1%	33.3%	31.6%	**30.4%**
Total		Count	91	93	316	**500**
		% within Option of Study	100.0%	100.0%	100.0%	**100.0%**



In the survey conducted 69.6% of students were **Doing** - I am flexible and open minded whilst 30.4% were **Watching** - I am careful and cautious, at the present time of their study.

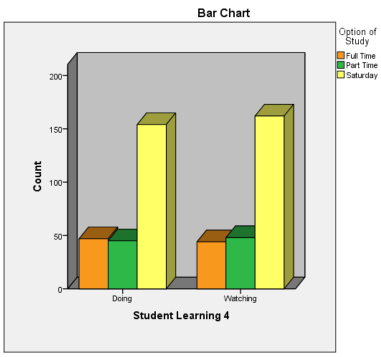
χ^2 (2) = 2.916, p =.233; H_0 = accepted

There was no significant statistical difference therefore H_0 has been accepted

SL4: Doing - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it.

Student Learning 4 * Option of Study Crosstabulation

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 4	Doing	Count	47	45	154	246
		% within Option of Study	51.6%	48.4%	48.7%	49.2%
	Watching	Count	44	48	162	254
		% within Option of Study	48.4%	51.6%	51.3%	50.8%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%



In the survey conducted 49.2% of students were **Doing** -I like to try new and different things without too much preparation whilst 50.8% were **Watching** - I investigate a new topic or process in depth before trying it, at the present time of their study.

χ^2 (2) = 0.270.p =.874; H_0 = accepted

There was no significant statistical difference therefore H_0 has been accepted

SL5: Doing - I am happy to have a go at new things. **Watching** - I draw up lists up possible courses of actions when starting a new project.

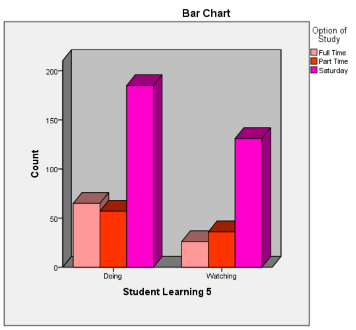
Student Learning 5 * Option of Study Crosstabulation

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 5	Doing	Count	65	57	185	307
		% within Option of Study	71.4%	61.3%	58.5%	61.4%
	Watching	Count	26	36	131	193
		% within Option of Study	28.6%	38.7%	41.5%	38.6%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%

In the survey conducted 61.4% of students were **SL5: Doing** - I am happy to have a go at new things whilst 38.6% were **Watching** - I draw up lists up possible courses of actions when starting a new project, at the present time of their study.

χ^2 (2) = 4.949.p =.084; H_0 = accepted

There was no significant statistical difference therefore H_0 has been accepted



SL6: Doing - I like to get involved and to participate. **Watching** - I like to read and observe.

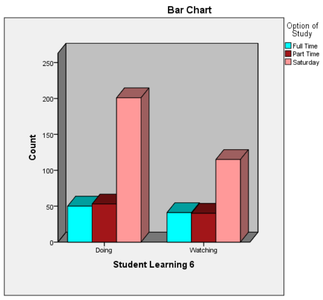
Student Learning 6 * Option of Study Crosstabulation

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 6	Doing	Count	50	53	201	304
		% within Option of Study	54.9%	57.0%	63.6%	60.8%
	Watching	Count	41	40	115	196
		% within Option of Study	45.1%	43.0%	36.4%	39.2%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%

In the survey conducted 61.4% of students were **SL6: Doing** I like to get involved and to participate whilst 38.6% were **Watching** - I like to read and observe, at the present time of their study.

χ^2 (2) = 2.921.p =.0.232; H_0 = accepted

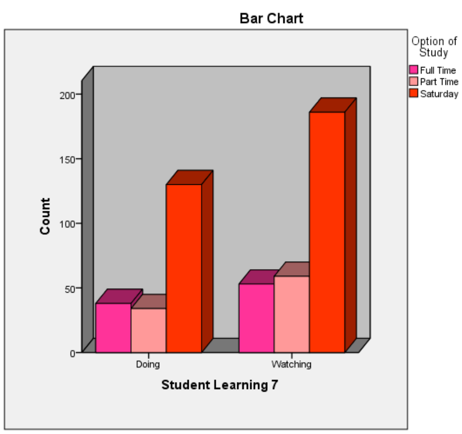
There was no significant statistical difference therefore H_0 has been accepted



SL7: Doing - I am loud and outgoing. **Watching** - I am quiet and somewhat shy.

Student Learning 7 * Option of Study Crosstabulation

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 7	Doing	Count	38	34	130	202
		% within Option of Study	41.8%	36.6%	41.1%	40.4%
	Watching	Count	53	59	186	298
		% within Option of Study	58.2%	63.4%	58.9%	59.6%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%



In the survey conducted 40.4% of students were **SL7: Doing -** I am loud and outgoing whilst 59.6% were **Watching** - I am quiet and somewhat shy, at the present time of their study.

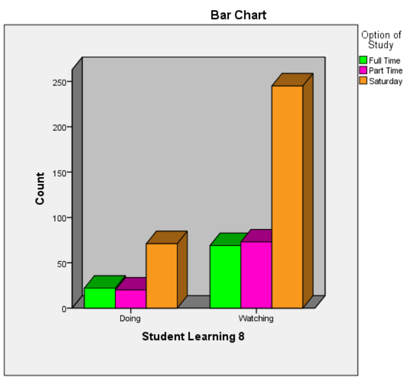
χ^2 (2) = 0.711.p =.711; H_0 = accepted

There was no significant statistical difference therefore H_0 has been accepted

SL8: Doing - I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

Student Learning 8 * Option of Study Crosstabulation

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 8	Doing	Count	22	20	71	113
		% within Option of Study	24.2%	21.5%	22.5%	22.6%
	Watching	Count	69	73	245	387
		% within Option of Study	75.8%	78.5%	77.5%	77.4%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%



In the survey conducted 22.6% of students were **SL8: Doing -** I make quick and bold decisions whilst 77.4% were **Watching** - I make cautious and logical decisions, at the present time of their study.

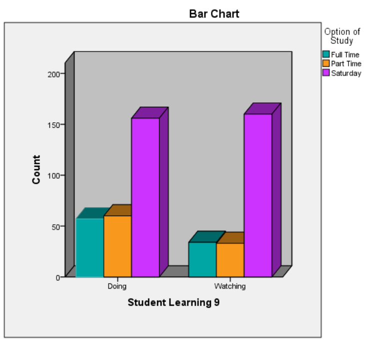
χ^2 (2) = 0.196.p =.0907; H_0 = accepted

There was no significant statistical difference therefore H_0 has been accepted

SL9: Doing - I speak fast, while thinking. **Watching** - I speak slowly, after thinking.

Student Learning 9 * Option of Study Crosstabulation

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 9	Doing	Count	57	60	156	273
		% within Option of Study	62.6%	64.5%	49.4%	54.6%
	Watching	Count	34	33	160	227
		% within Option of Study	37.4%	35.5%	50.6%	45.4%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%



In the survey conducted 54.6% of students were **SL9: Doing -** I speak fast, while thinking whilst 45.4% were **Watching** - I speak slowly, after thinking, at the present time of their study

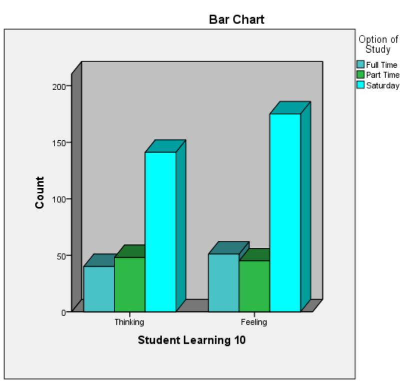
χ^2 (2) = 9.210, p =.008; H_0 = rejected

There was a significant statistical difference as p value is less than 0.05, therefore H_0 has been rejected

SL10: Thinking - I ask probing questions when learning a new subject. **Feeling** - I am good at picking up hints and techniques from other people.

Student Learning 10 * Option of Study Crosstabulation

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 10	Thinking	Count	40	48	141	229
		% within Option of Study	44.0%	51.6%	44.6%	45.8%
	Feeling	Count	51	45	175	271
		% within Option of Study	56.0%	48.4%	55.4%	54.2%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%



In the survey conducted 45.8% of students were **SL10: Thinking** I ask probing questions when learning a new subject whilst 54.2% were **Feeling** - I am good at picking up hints and techniques from other people, at the present time of their study

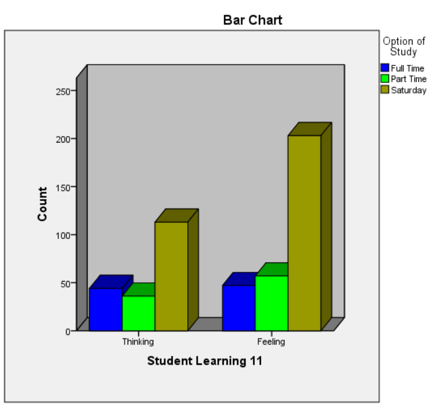
χ^2 (2) = 1.588.p =.0457; H_0 = accepted

There was no observable difference in responses therefore H_0 has been accepted

SL11: Thinking - I am rational and logical. **Feeling** - I am practical and down to earth.

Student Learning 11 * Option of Study Crosstabulation

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 11	Thinking	Count	44	36	113	193
		% within Option of Study	48.4%	38.7%	35.8%	38.6%
	Feeling	Count	47	57	203	307
		% within Option of Study	51.6%	61.3%	64.2%	61.4%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%



In the survey conducted 38.6% of students were **SL11: Thinking** - I am rational and logical whilst 61.4% were **Feeling** - I am practical and down to earth, at the present time of their study

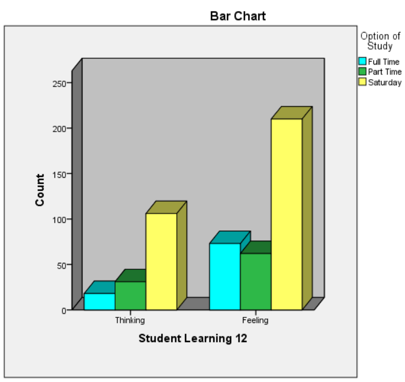
χ^2 (2) = 4.728 .p =.094; H_0 = accepted

There was no significant statistical difference therefore H_0 has been accepted

SL12: Thinking - I plan events down to the last detail. **Feeling** - I like realistic, but flexible plans.

Student Learning 12 * Option of Study Crosstabulation

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 12	Thinking	Count	18	31	106	155
		% within Option of Study	19.8%	33.3%	33.5%	31.0%
	Feeling	Count	73	62	210	345
		% within Option of Study	80.2%	66.7%	66.5%	69.0%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%



In the survey conducted 31% of students were **SL12: Thinking** - I plan events down to the last detail whilst 69% were **Feeling** - I like realistic, but flexible plans, at the present time of their study

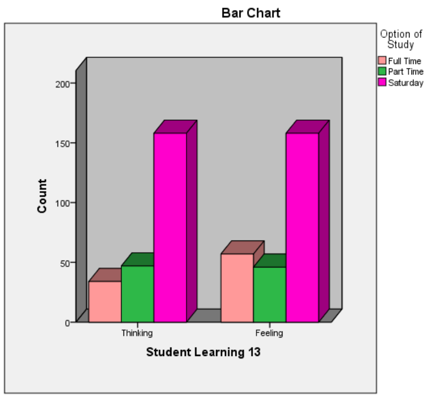
χ^2 (2) = 6.549, p =.038; H_0 = rejected

There was a significant statistical difference as p value is less than 0.05, therefore H_0 has been rejected

SL13: Thinking - I like to know the right answers before trying something new. **Feeling** - I try things out by practicing to see if they work.

Student Learning 13 * Option of Study Crosstabulation

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 13	Thinking	Count	34	47	158	239
		% within Option of Study	37.4%	50.5%	50.0%	47.8%
	Feeling	Count	57	46	158	261
		% within Option of Study	62.6%	49.5%	50.0%	52.2%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%



In the survey conducted 47.8% of students were **Thinking** - I like to know the right answers before trying something new whilst 52.2% were **Feeling** - I try things out by practicing to see if they work, at the present time of their study

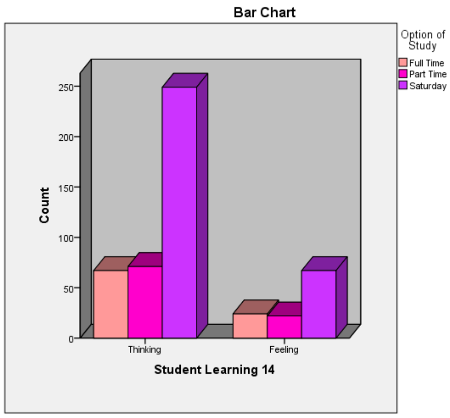
χ^2 (2) = 4.865.p =.088; H_0 = accepted

There was no significant statistical difference therefore H_0 has been accepted

SL14: Thinking - I analyze reports to find the basic assumptions and inconsistencies. **Feeling** - I rely upon others to give me the basic gist of reports.

Student Learning 14 * Option of Study Crosstabulation

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 14	Thinking	Count	67	71	249	387
		% within Option of Study	73.6%	76.3%	78.8%	77.4%
	Feeling	Count	24	22	67	113
		% within Option of Study	26.4%	23.7%	21.2%	22.6%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%



In the survey conducted 77.4% of students were **Thinking** - I analyze reports to find the basic assumptions and inconsistencies whilst 22.6% were **Feeling** - I rely upon others to give me the basic gist of reports, at the present time of their study

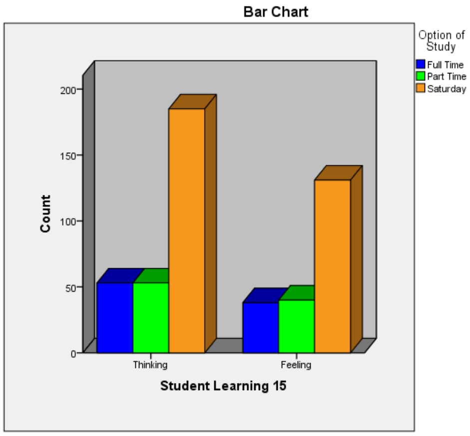
χ^2 (2) = 3.219.p =.562; H_0 = accepted

There was no significant statistical difference therefore H_0 has been accepted

SL15: Thinking - I prefer working alone. **Feeling** - I enjoy working with others.

Student Learning 15 * Option of Study Crosstabulation

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 15	Thinking	Count	53	53	185	291
		% within Option of Study	58.2%	57.0%	58.5%	58.2%
	Feeling	Count	38	40	131	209
		% within Option of Study	41.8%	43.0%	41.5%	41.8%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%



In the survey conducted 58.2% of students were **Thinking** - I prefer working alone whilst 41.8% were **Feeling** - I enjoy working with others, at the present time of their study

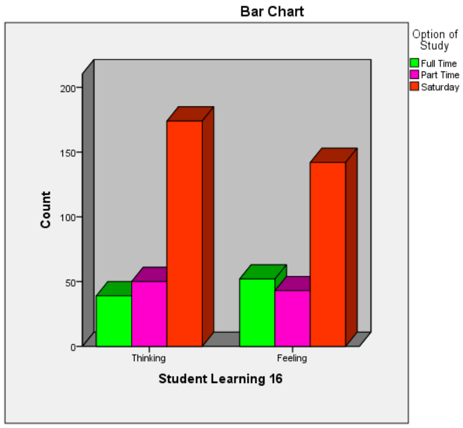
χ^2 (2) = 0.072.p =.962; H_0 = accepted

There was no significant statistical difference therefore H_0 has been accepted

SL16: Thinking - Others would describe me as serious, reserved, and formal. **Feeling** - Others would describe me as verbal, expressive, and informal.

Student Learning 16 * Option of Study Crosstabulation

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 16	Thinking	Count	39	50	174	263
		% within Option of Study	42.9%	53.8%	55.1%	52.6%
	Feeling	Count	52	43	142	237
		% within Option of Study	57.1%	46.2%	44.9%	47.4%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%



In the survey conducted 52.6% of students were **Thinking** - Others would describe me as serious, reserved, and formal whilst 47.4% were **Feeling** - Others would describe me as verbal, expressive, and informal, at the present time of their study

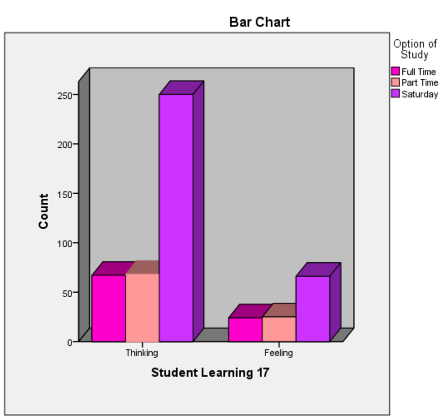
χ^2 (2) = 4.605.p =.0117; H_0 = accepted

There was no significant statistical difference therefore H_0 has been accepted

SL17: Thinking - I use facts to make decisions. **Feeling** - I use feelings to make decisions.

Student Learning 17 * Option of Study Crosstabulation

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 17	Thinking	Count	67	68	250	385
		% within Option of Study	73.6%	73.1%	79.1%	77.0%
	Feeling	Count	24	25	66	115
		% within Option of Study	26.4%	26.9%	20.9%	23.0%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%



In the survey conducted 77% of students were **Thinking** - I use facts to make decisions whilst 23% were **Feeling** - I use feelings to make decisions, at the present time of their study

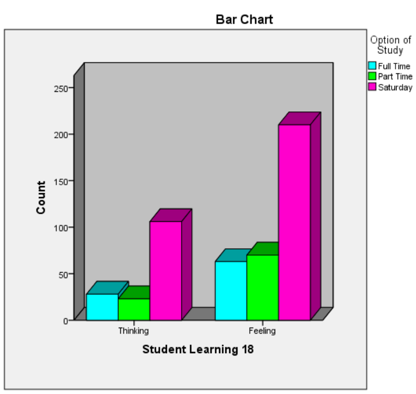
χ^2 (2) = 2.173.p =0.337; H_0 = accepted

There was no significant statistical difference therefore H_0 has been accepted

SL18: Thinking - I am difficult to get to know. **Feeling** - I am easy to get to know.

Student Learning 18 * Option of Study Crosstabulation

			Option of Study			Total
			Full Time	Part Time	Saturday	
Student Learning 18	Thinking	Count	28	23	106	157
		% within Option of Study	30.8%	24.7%	33.5%	31.4%
	Feeling	Count	63	70	210	343
		% within Option of Study	69.2%	75.3%	66.5%	68.6%
Total		Count	91	93	316	500
		% within Option of Study	100.0%	100.0%	100.0%	100.0%



In the survey conducted 31.4% of students were **Thinking** - I am difficult to get to know whilst 68.6% were **Feeling** - I am easy to get to know, at the present time of their study

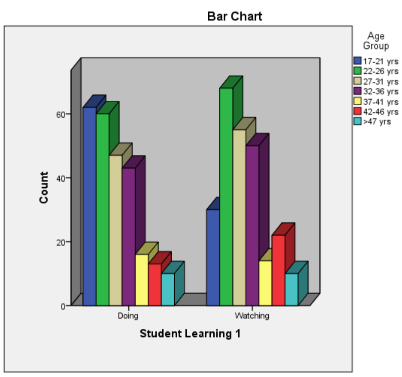
χ^2 (2) = 2.611.p =0.271; H_0 = accepted

There was no significant statistical difference therefore H_0 has been accepted

SL1: Doing - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical.

In the survey conducted 50.2% of students were **doing** (I often produce off-the-cuff ideas that at first might seem silly or half-baked) whilst 49.8% were **watching** I am thorough and methodical.) at the present time of their study. There is observable difference in the responses therefore H_0 has been rejected

χ^2 (6) = 15.225, p =0.019; H_0 = rejected



Age Group * Student Learning 1 Crosstabulation

		Student Learning 1		Total
		Doing	Watching	
Age Group	17-21 yrs	**62**	**30**	**92**
		67.4%	32.6%	100.0%
	22-26 yrs	**60**	**68**	**128**
		46.9%	53.1%	100.0%
	27-31 yrs	**47**	**55**	**102**
		46.1%	53.9%	100.0%
	32-36 yrs	**43**	**50**	**93**
		46.2%	53.8%	100.0%
	37-41 yrs	**16**	**14**	**30**
		53.3%	46.7%	100.0%
	42-46 yrs	**13**	**22**	**35**
		37.1%	62.9%	100.0%
	>47 yrs	**10**	**10**	**20**
		50.0%	50.0%	100.0%
Total		**251**	**249**	**500**
		50.2%	49.8%	100.0%

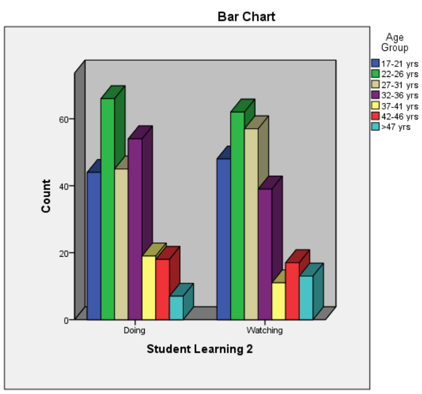
SL2: Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people.

In the survey conducted 50.6% of students were **doing** (I am normally the one who initiates conversations) whilst 49.4% were **watching** (I enjoy watching people) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (6) = 8.021, p =0.237; H_0 = accepted

Age Group * Student Learning 2 Crosstabulation

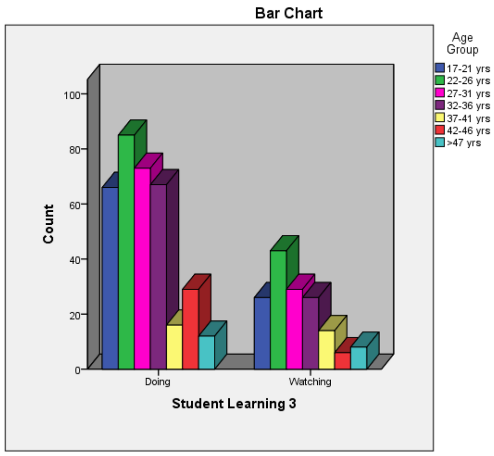
			Student Learning 2		Total
			Doing	Watching	
Age Group	17-21 yrs	Count	44	48	92
		% within Age Group	47.8%	52.2%	100.0%
	22-26 yrs	Count	66	62	128
		% within Age Group	51.6%	48.4%	100.0%
	27-31 yrs	Count	45	57	102
		% within Age Group	44.1%	55.9%	100.0%
	32-36 yrs	Count	54	39	93
		% within Age Group	58.1%	41.9%	100.0%
	37-41 yrs	Count	19	11	30
		% within Age Group	63.3%	36.7%	100.0%
	42-46 yrs	Count	18	17	35
		% within Age Group	51.4%	48.6%	100.0%
	>47 yrs	Count	7	13	20
		% within Age Group	35.0%	65.0%	100.0%
Total		Count	253	247	500
		% within Age Group	50.6%	49.4%	100.0%



SL3: Doing - I am flexible and open minded. **Watching** - I am careful and cautious.

In the survey conducted 69.6% of students were **doing** (I am flexible and open minded) whilst 30.4% were **watching** (I am careful and cautious) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (6) = 8.775, p =0.185; H_0 = accepted



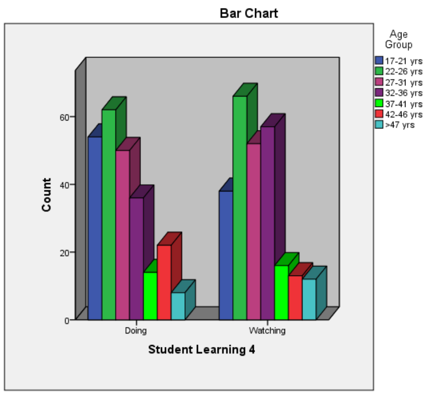
Age Group * Student Learning 3 Crosstabulation

			Student Learning 3		Total
			Doing	Watching	
Age Group	17-21 yrs	Count	66	26	92
		% within Age Group	71.7%	28.3%	100.0%
	22-26 yrs	Count	85	43	128
		% within Age Group	66.4%	33.6%	100.0%
	27-31 yrs	Count	73	29	102
		% within Age Group	71.6%	28.4%	100.0%
	32-36 yrs	Count	67	26	93
		% within Age Group	72.0%	28.0%	100.0%
	37-41 yrs	Count	16	14	30
		% within Age Group	53.3%	46.7%	100.0%
	42-46 yrs	Count	29	6	35
		% within Age Group	82.9%	17.1%	100.0%
	>47 yrs	Count	12	8	20
		% within Age Group	60.0%	40.0%	100.0%
Total		Count	348	152	500
		% within Age Group	69.6%	30.4%	100.0%

SL4: Doing - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it.

In the survey conducted 49.2% of students were **doing** (I like to try new and different things without too much preparation) whilst 50.8% were **watching** (- I investigate a new topic or process in depth before trying it) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (6) = 10.811, p =0.094; H_0 = accepted



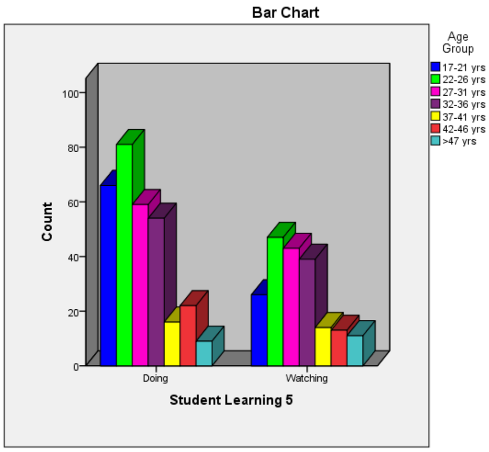
Age Group * Student Learning 4 Crosstabulation

			Student Learning 4		Total
			Doing	Watching	
Age Group	17-21 yrs	Count	54	38	92
		% within Age Group	58.7%	41.3%	100.0%
	22-26 yrs	Count	62	66	128
		% within Age Group	48.4%	51.6%	100.0%
	27-31 yrs	Count	50	52	102
		% within Age Group	49.0%	51.0%	100.0%
	32-36 yrs	Count	36	57	93
		% within Age Group	38.7%	61.3%	100.0%
	37-41 yrs	Count	14	16	30
		% within Age Group	46.7%	53.3%	100.0%
	42-46 yrs	Count	22	13	35
		% within Age Group	62.9%	37.1%	100.0%
	>47 yrs	Count	8	12	20
		% within Age Group	40.0%	60.0%	100.0%
Total		Count	246	254	500
		% within Age Group	49.2%	50.8%	100.0%

SL5: Doing - I am happy to have a go at new things. **Watching** - I draw up lists up possible courses of actions when starting a new project.

In the survey conducted 61.4% of students were **doing** (I am happy to have a go at new things) whilst 38.6% were **watching** I draw up lists up possible courses of actions when starting a new project) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (6) = 8.446, p =0.207; H_0 = accepted



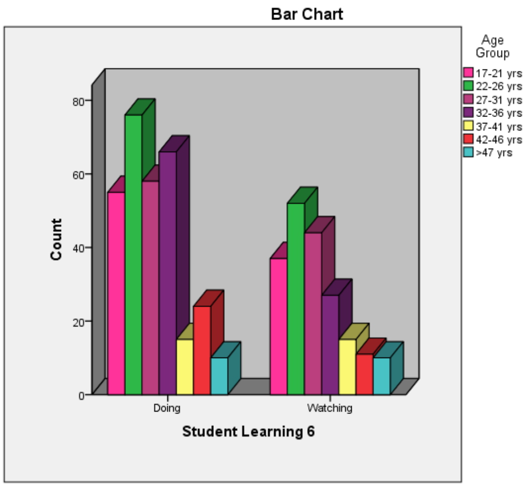
Age Group * Student Learning 5 Crosstabulation

			Student Learning 5		Total
			Doing	Watching	
Age Group	17-21 yrs	Count	66	26	92
		% within Age Group	71.7%	28.3%	100.0%
	22-26 yrs	Count	81	47	128
		% within Age Group	63.3%	36.7%	100.0%
	27-31 yrs	Count	59	43	102
		% within Age Group	57.8%	42.2%	100.0%
	32-36 yrs	Count	54	39	93
		% within Age Group	58.1%	41.9%	100.0%
	37-41 yrs	Count	16	14	30
		% within Age Group	53.3%	46.7%	100.0%
	42-46 yrs	Count	22	13	35
		% within Age Group	62.9%	37.1%	100.0%
	>47 yrs	Count	9	11	20
		% within Age Group	45.0%	55.0%	100.0%
Total		Count	307	193	500
		% within Age Group	61.4%	38.6%	100.0%

SL6: Doing - I like to get involved and to participate. **Watching** - I like to read and observe.

In the survey conducted 60.8% of students were **doing** (I like to get involved and to participate) whilst 39.2% were **watching** (I like to read and observe) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (6) = 8.180, p =0.225; H_0 = accepted



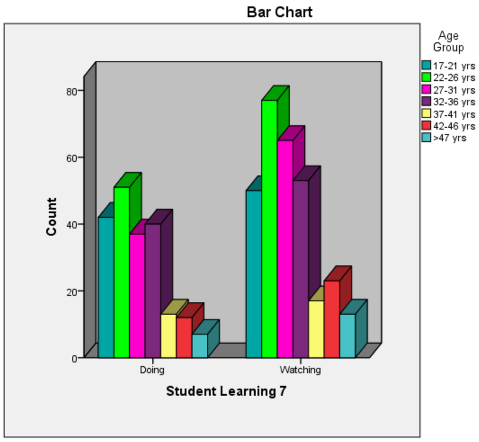
Age Group * Student Learning 6 Crosstabulation

			Student Learning 6		Total
			Doing	Watching	
Age Group	17-21 yrs	Count	55	37	92
		% within Age Group	59.8%	40.2%	100.0%
	22-26 yrs	Count	76	52	128
		% within Age Group	59.4%	40.6%	100.0%
	27-31 yrs	Count	58	44	102
		% within Age Group	56.9%	43.1%	100.0%
	32-36 yrs	Count	66	27	93
		% within Age Group	71.0%	29.0%	100.0%
	37-41 yrs	Count	15	15	30
		% within Age Group	50.0%	50.0%	100.0%
	42-46 yrs	Count	24	11	35
		% within Age Group	68.6%	31.4%	100.0%
	>47 yrs	Count	10	10	20
		% within Age Group	50.0%	50.0%	100.0%
Total		Count	304	196	500
		% within Age Group	60.8%	39.2%	100.0%

SL7: Doing - I am loud and outgoing. **Watching** - I am quiet and somewhat shy.

In the survey conducted 40.4% of students were **doing** (I am loud and outgoing) whilst 59.6% were **watching** (I am quiet and somewhat shy) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (6) = 2.948, p =0.815; H_0 = accepted



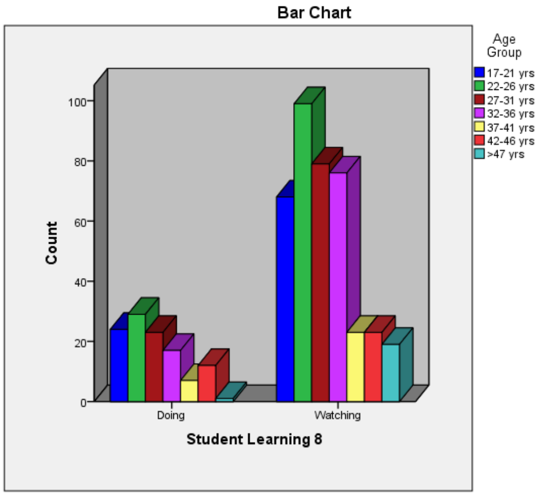
Age Group * Student Learning 7 Crosstabulation

			Student Learning 7		Total
			Doing	Watching	
Age Group	17-21 yrs	Count	42	50	92
		% within Age Group	45.7%	54.3%	100.0%
	22-26 yrs	Count	51	77	128
		% within Age Group	39.8%	60.2%	100.0%
	27-31 yrs	Count	37	65	102
		% within Age Group	36.3%	63.7%	100.0%
	32-36 yrs	Count	40	53	93
		% within Age Group	43.0%	57.0%	100.0%
	37-41 yrs	Count	13	17	30
		% within Age Group	43.3%	56.7%	100.0%
	42-46 yrs	Count	12	23	35
		% within Age Group	34.3%	65.7%	100.0%
	>47 yrs	Count	7	13	20
		% within Age Group	35.0%	65.0%	100.0%
Total		Count	202	298	500
		% within Age Group	40.4%	59.6%	100.0%

SL8: Doing - I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

In the survey conducted 22.6% of students were **doing** (I make quick and bold decisions) whilst 77.4% were **watching** (I make cautious and logical decisions) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (6) = 7.915, p =0.244; H_0 = accepted



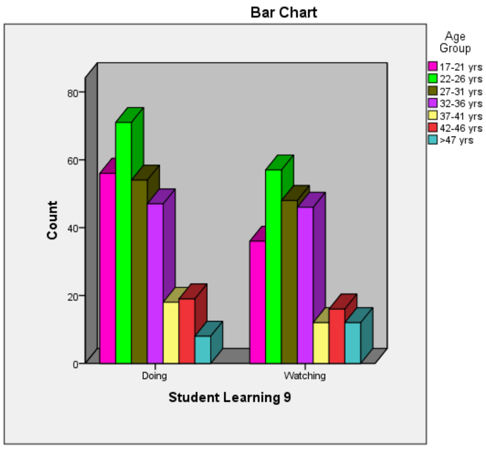
Age Group * Student Learning 8 Crosstabulation

			Student Learning 8		Total
			Doing	Watching	
Age Group	17-21 yrs	Count	24	68	92
		% within Age Group	26.1%	73.9%	100.0%
	22-26 yrs	Count	29	99	128
		% within Age Group	22.7%	77.3%	100.0%
	27-31 yrs	Count	23	79	102
		% within Age Group	22.5%	77.5%	100.0%
	32-36 yrs	Count	17	76	93
		% within Age Group	18.3%	81.7%	100.0%
	37-41 yrs	Count	7	23	30
		% within Age Group	23.3%	76.7%	100.0%
	42-46 yrs	Count	12	23	35
		% within Age Group	34.3%	65.7%	100.0%
	>47 yrs	Count	1	19	20
		% within Age Group	5.0%	95.0%	100.0%
Total		Count	113	387	500
		% within Age Group	22.6%	77.4%	100.0%

SL9: Doing - I speak fast, while thinking. **Watching** - I speak slowly, after thinking.

In the survey conducted 54.6% of students were **doing** (I speak fast, while thinking) whilst 45.5% were **watching** (I speak slowly, after thinking) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (6) = 4.304, p =0.636; H_0 = accepted



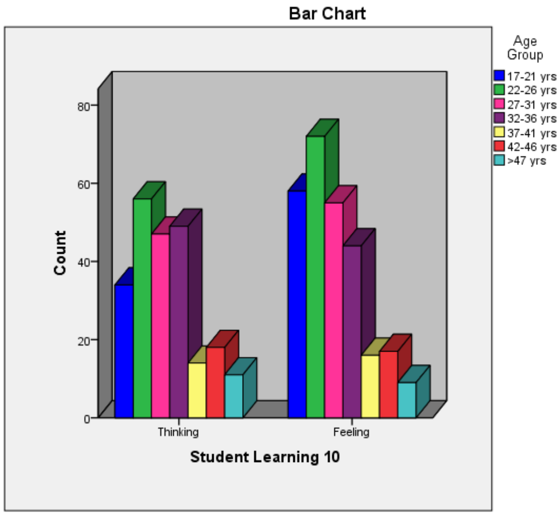
Age Group * Student Learning 9 Crosstabulation

			Student Learning 9		Total
			Doing	Watching	
Age Group	17-21 yrs	Count	56	36	92
		% within Age Group	60.9%	39.1%	100.0%
	22-26 yrs	Count	71	57	128
		% within Age Group	55.5%	44.5%	100.0%
	27-31 yrs	Count	54	48	102
		% within Age Group	52.9%	47.1%	100.0%
	32-36 yrs	Count	47	46	93
		% within Age Group	50.5%	49.5%	100.0%
	37-41 yrs	Count	18	12	30
		% within Age Group	60.0%	40.0%	100.0%
	42-46 yrs	Count	19	16	35
		% within Age Group	54.3%	45.7%	100.0%
	>47 yrs	Count	8	12	20
		% within Age Group	40.0%	60.0%	100.0%
Total		Count	273	227	500
		% within Age Group	54.6%	45.4%	100.0%

SL10: Thinking - I ask probing questions when learning a new subject. **Feeling** - I am good at picking up hints and techniques from other people.

In the survey conducted 45.8% of students were **thinking** (I ask probing questions when learning a new subject) whilst 54.2% were **feeling** (I am good at picking up hints and techniques from other people.) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (6) = 6.034, p =0.419; H_0 = accepted



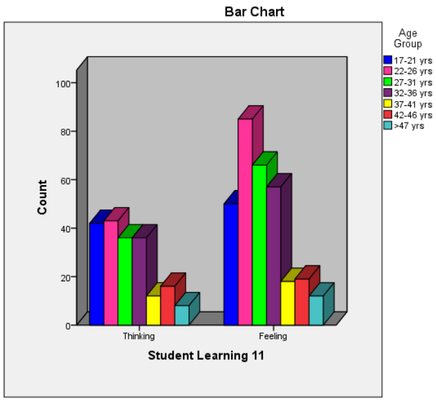
Age Group * Student Learning 10 Crosstabulation

			Student Learning 10		Total
			Thinking	Feeling	
Age Group	17-21 yrs	Count	34	58	92
		% within Age Group	37.0%	63.0%	100.0%
	22-26 yrs	Count	56	72	128
		% within Age Group	43.8%	56.2%	100.0%
	27-31 yrs	Count	47	55	102
		% within Age Group	46.1%	53.9%	100.0%
	32-36 yrs	Count	49	44	93
		% within Age Group	52.7%	47.3%	100.0%
	37-41 yrs	Count	14	16	30
		% within Age Group	46.7%	53.3%	100.0%
	42-46 yrs	Count	18	17	35
		% within Age Group	51.4%	48.6%	100.0%
	>47 yrs	Count	11	9	20
		% within Age Group	55.0%	45.0%	100.0%
Total		Count	229	271	500
		% within Age Group	45.8%	54.2%	100.0%

SL11: Thinking - I am rational and logical. **Feeling** - I am practical and down to earth.

In the survey conducted 38.6% of students were **thinking** (I am rational and logical) whilst 61.4% were **feeling** (I am practical and down to earth) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (6) = 4.544, p =0.604; H_0 = accepted



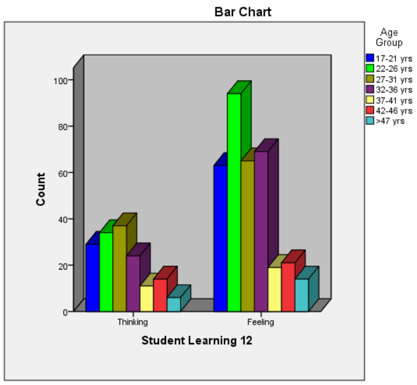
Age Group * Student Learning 11 Crosstabulation

			Student Learning 11		Total
			Thinking	Feeling	
Age Group	17-21 yrs	Count	42	50	92
		% within Age Group	45.7%	54.3%	100.0%
	22-26 yrs	Count	43	85	128
		% within Age Group	33.6%	66.4%	100.0%
	27-31 yrs	Count	36	66	102
		% within Age Group	35.3%	64.7%	100.0%
	32-36 yrs	Count	36	57	93
		% within Age Group	38.7%	61.3%	100.0%
	37-41 yrs	Count	12	18	30
		% within Age Group	40.0%	60.0%	100.0%
	42-46 yrs	Count	16	19	35
		% within Age Group	45.7%	54.3%	100.0%
	>47 yrs	Count	8	12	20
		% within Age Group	40.0%	60.0%	100.0%
Total		Count	193	307	500
		% within Age Group	38.6%	61.4%	100.0%

SL12: Thinking - I plan events down to the last detail. **Feeling** - I like realistic, but flexible plans.

In the survey conducted 31% of students were **thinking** (I plan events down to the last detail) whilst 69% were **feeling** (I like realistic, but flexible plans.) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (6) = 5.475, p =0.485; H_0 = accepted



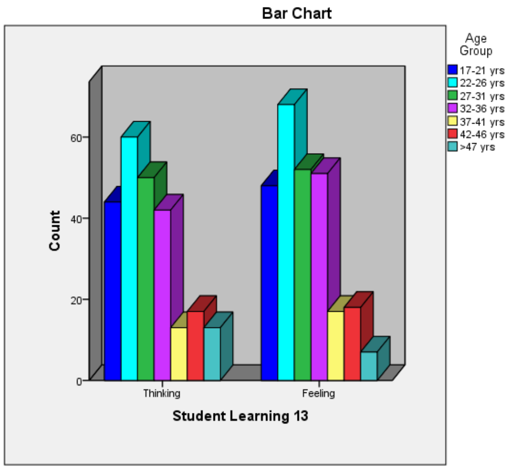
Age Group * Student Learning 11 Crosstabulation

			Student Learning 11		Total
			Thinking	Feeling	
Age Group	17-21 yrs	Count	42	50	92
		% within Age Group	45.7%	54.3%	100.0%
	22-26 yrs	Count	43	85	128
		% within Age Group	33.6%	66.4%	100.0%
	27-31 yrs	Count	36	66	102
		% within Age Group	35.3%	64.7%	100.0%
	32-36 yrs	Count	36	57	93
		% within Age Group	38.7%	61.3%	100.0%
	37-41 yrs	Count	12	18	30
		% within Age Group	40.0%	60.0%	100.0%
	42-46 yrs	Count	16	19	35
		% within Age Group	45.7%	54.3%	100.0%
	>47 yrs	Count	8	12	20
		% within Age Group	40.0%	60.0%	100.0%
Total		Count	193	307	500
		% within Age Group	38.6%	61.4%	100.0%

SL13: Thinking - I like to know the right answers before trying something new. **Feeling** - I try things out by practicing to see if they work.

In the survey conducted 47.8% of students were **thinking** (I like to know the right answers before trying something new) whilst 52.2% were **feeling** (I try things out by practicing to see if they work) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (6) = 2.984, p =0.811; H_0 = accepted



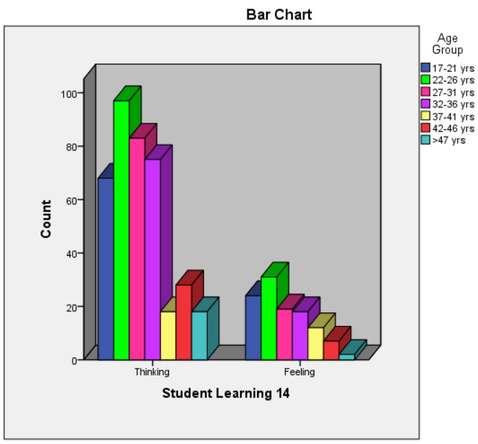
Age Group * Student Learning 13 Crosstabulation

			Student Learning 13		Total
			Thinking	Feeling	
Age Group	17-21 yrs	Count	44	48	92
		% within Age Group	47.8%	52.2%	100.0%
	22-26 yrs	Count	60	68	128
		% within Age Group	46.9%	53.1%	100.0%
	27-31 yrs	Count	50	52	102
		% within Age Group	49.0%	51.0%	100.0%
	32-36 yrs	Count	42	51	93
		% within Age Group	45.2%	54.8%	100.0%
	37-41 yrs	Count	13	17	30
		% within Age Group	43.3%	56.7%	100.0%
	42-46 yrs	Count	17	18	35
		% within Age Group	48.6%	51.4%	100.0%
	>47 yrs	Count	13	7	20
		% within Age Group	65.0%	35.0%	100.0%
Total		Count	239	261	500
		% within Age Group	47.8%	52.2%	100.0%

SL14: Thinking - I analyze reports to find the basic assumptions and inconsistencies. **Feeling** - I rely upon others to give me the basic gist of reports.

In the survey conducted 77.4% of students were **thinking** (I analyze reports to find the basic assumptions and inconsistencies) whilst 22.6% were **feeling** (I rely upon others to give me the basic gist of reports) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (6) = 9.454, p =0.150; H_0 = accepted



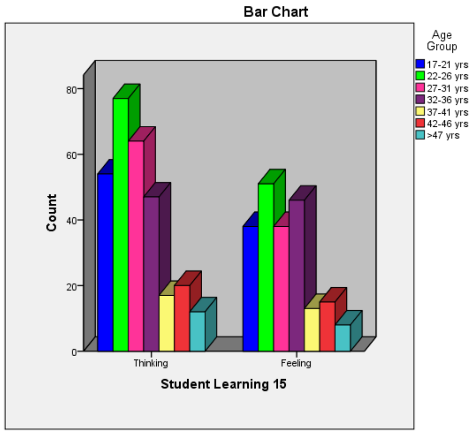
Age Group * Student Learning 14 Crosstabulation

			Student Learning 14		Total
			Thinking	Feeling	
Age Group	17-21 yrs	Count	68	24	92
		% within Age Group	73.9%	26.1%	100.0%
	22-26 yrs	Count	97	31	128
		% within Age Group	75.8%	24.2%	100.0%
	27-31 yrs	Count	83	19	102
		% within Age Group	81.4%	18.6%	100.0%
	32-36 yrs	Count	75	18	93
		% within Age Group	80.6%	19.4%	100.0%
	37-41 yrs	Count	18	12	30
		% within Age Group	60.0%	40.0%	100.0%
	42-46 yrs	Count	28	7	35
		% within Age Group	80.0%	20.0%	100.0%
	>47 yrs	Count	18	2	20
		% within Age Group	90.0%	10.0%	100.0%
Total		Count	387	113	500
		% within Age Group	77.4%	22.6%	100.0%

SL15: Thinking - I prefer working alone. **Feeling** - I enjoy working with others.

In the survey conducted 58.2% of students were **thinking** (I prefer working alone) whilst 41.8% were **feeling** (- I enjoy working with others) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (6) = 3.393, p =0.758; H_0 = accepted



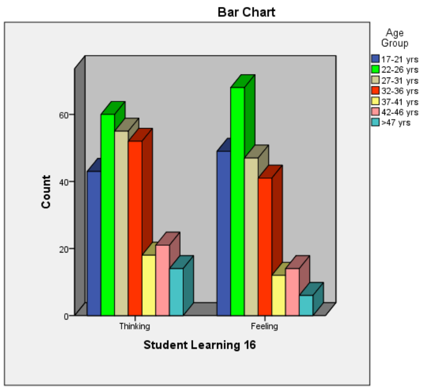
Age Group * Student Learning 15 Crosstabulation

			Student Learning 15		Total
			Thinking	Feeling	
Age Group	17-21 yrs	Count	54	38	92
		% within Age Group	58.7%	41.3%	100.0%
	22-26 yrs	Count	77	51	128
		% within Age Group	60.2%	39.8%	100.0%
	27-31 yrs	Count	64	38	102
		% within Age Group	62.7%	37.3%	100.0%
	32-36 yrs	Count	47	46	93
		% within Age Group	50.5%	49.5%	100.0%
	37-41 yrs	Count	17	13	30
		% within Age Group	56.7%	43.3%	100.0%
	42-46 yrs	Count	20	15	35
		% within Age Group	57.1%	42.9%	100.0%
	>47 yrs	Count	12	8	20
		% within Age Group	60.0%	40.0%	100.0%
Total		Count	291	209	500
		% within Age Group	58.2%	41.8%	100.0%

SL16: Thinking - Others would describe me as serious, reserved, and formal. **Feeling** - Others would describe me as verbal, expressive, and informal.

In the survey conducted 52.6% of students were **thinking** (Others would describe me as serious, reserved, and formal) whilst 47.4% were **feeling** (Others would describe me as verbal, expressive, and informal) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (6) = 7.288, p =0.295; H_0 = accepted



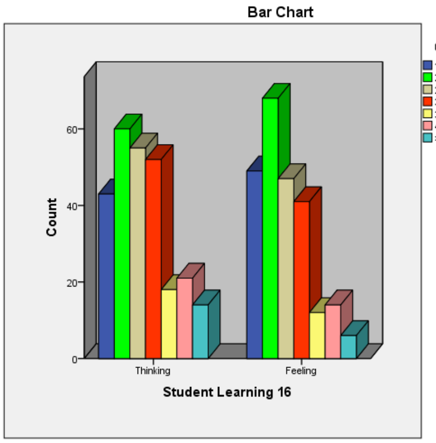
Age Group * Student Learning 16 Crosstabulation

			Student Learning 16		Total
			Thinking	Feeling	
Age Group	17-21 yrs	Count	43	49	92
		% within Age Group	46.7%	53.3%	100.0%
	22-26 yrs	Count	60	68	128
		% within Age Group	46.9%	53.1%	100.0%
	27-31 yrs	Count	55	47	102
		% within Age Group	53.9%	46.1%	100.0%
	32-36 yrs	Count	52	41	93
		% within Age Group	55.9%	44.1%	100.0%
	37-41 yrs	Count	18	12	30
		% within Age Group	60.0%	40.0%	100.0%
	42-46 yrs	Count	21	14	35
		% within Age Group	60.0%	40.0%	100.0%
	>47 yrs	Count	14	6	20
		% within Age Group	70.0%	30.0%	100.0%
Total		Count	263	237	500
		% within Age Group	52.6%	47.4%	100.0%

SL17: Thinking - I use facts to make decisions. **Feeling** - I use feelings to make decisions.

In the survey conducted 77% of students were **thinking** (I use facts to make decisions) whilst 23% were **feeling** (I use feelings to make decisions) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (6) = 5.729, p =0.454; H_0 = accepted



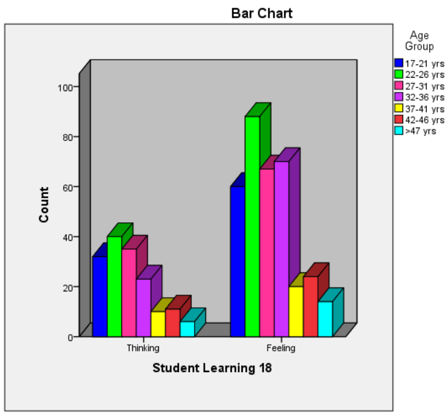
Age Group * Student Learning 17 Crosstabulation

			Student Learning 17		Total
			Thinking	Feeling	
Age Group	17-21 yrs	Count	66	26	92
		% within Age Group	71.7%	28.3%	100.0%
	22-26 yrs	Count	95	33	128
		% within Age Group	74.2%	25.8%	100.0%
	27-31 yrs	Count	77	25	102
		% within Age Group	75.5%	24.5%	100.0%
	32-36 yrs	Count	75	18	93
		% within Age Group	80.6%	19.4%	100.0%
	37-41 yrs	Count	25	5	30
		% within Age Group	83.3%	16.7%	100.0%
	42-46 yrs	Count	30	5	35
		% within Age Group	85.7%	14.3%	100.0%
	>47 yrs	Count	17	3	20
		% within Age Group	85.0%	15.0%	100.0%
Total		Count	385	115	500
		% within Age Group	77.0%	23.0%	100.0%

SL18: Thinking - I am difficult to get to know. **Feeling** - I am easy to get to know.

In the survey conducted 31.4% of students were **thinking** (I am difficult to get to know) whilst 68.6% were **feeling** (I am easy to get to know) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (6) = 2.882, p =0.823; H_0 = accepted



Age Group * Student Learning 18 Crosstabulation

			Student Learning 18		Total
			Thinking	Feeling	
Age Group	17-21 yrs	Count	32	60	92
		% within Age Group	34.8%	65.2%	100.0%
	22-26 yrs	Count	40	88	128
		% within Age Group	31.2%	68.8%	100.0%
	27-31 yrs	Count	35	67	102
		% within Age Group	34.3%	65.7%	100.0%
	32-36 yrs	Count	23	70	93
		% within Age Group	24.7%	75.3%	100.0%
	37-41 yrs	Count	10	20	30
		% within Age Group	33.3%	66.7%	100.0%
	42-46 yrs	Count	11	24	35
		% within Age Group	31.4%	68.6%	100.0%
	>47 yrs	Count	6	14	20
		% within Age Group	30.0%	70.0%	100.0%
Total		Count	157	343	500
		% within Age Group	31.4%	68.6%	100.0%

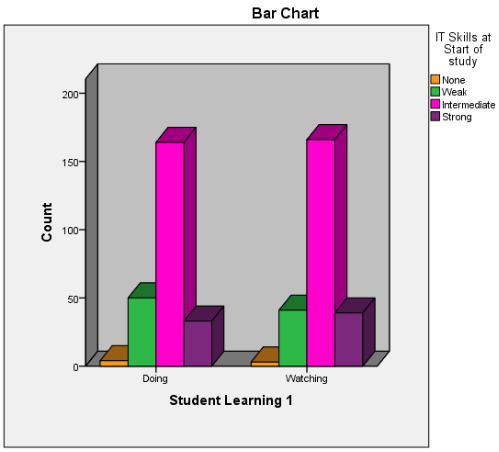
IT Skills at the start of study.

SL1 Doing - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical.

Student Learning 1 * IT Skills at Start of study Crosstabulation

			IT Skills at Start of study				Total
			None	Weak	Intermediate	Strong	
Student Learning 1	Doing	Count	4	50	164	33	251
		% within IT Skills at Start	57.1%	54.9%	49.7%	45.8%	50.2%
	Watching	Count	3	41	166	39	249
		% within IT Skills at Start	42.9%	45.1%	50.3%	54.2%	49.8%

Total	Count	7	91	330	72	500
	% within IT Skills at Start	100.0%	100.0%	100.0%	100.0%	100.0%



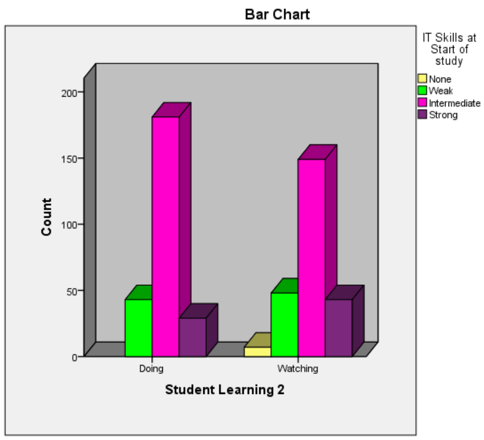
In the survey conducted 50.2% of students were **doing** (I often produce off-the-cuff ideas that at first might seem silly or half-baked) whilst 49.8% were **watching** (I am thorough and methodical) at the start of their study. There was no significant statistical difference therefore H_0 has been accepted

χ^2 (3) = 1.537.p =0.674; H_0 = accepted

SI2: Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people.

Student Learning 2 * IT Skills at Start of study Crosstabulation

			IT Skills at Start of study				Total
			None	Weak	Intermediate	Strong	
Student Learning 2	Doing	Count	0	43	181	29	253
		% within IT Skills at Start of study	0.0%	47.3%	54.8%	40.3%	50.6%
	Watching	Count	7	48	149	43	247
		% within IT Skills at Start of study	100.0%	52.7%	45.2%	59.7%	49.4%
Total		Count	7	91	330	72	500
		% within IT Skills at Start of study	100.0%	100.0%	100.0%	100.0%	100.0%



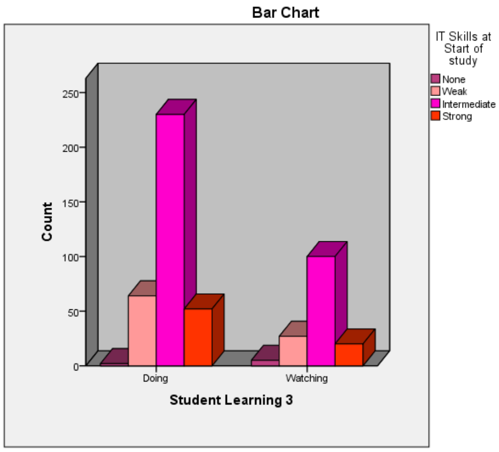
In the survey conducted 50.6% of students were **doing** (I am normally the one who initiates conversations) whilst 49.4% were **watching** (I enjoy watching people) at the start of their study. There is observable difference in the responses therefore H_0 has been rejected

χ^2 (3) = 13.030.p =0.005; H_0 = rejected

SL3: Doing - I am flexible and open minded. **Watching** - I am careful and cautious.

Student Learning 3 * IT Skills at Start of study Crosstabulation

			IT Skills at Start of study				Total
			None	Weak	Intermediate	Strong	
69Student Learning 3	Doing	Count	2	64	230	52	348
		% within IT Skills at Start of study	28.6%	70.3%	69.7%	72.2%	69.6%
	Watching	Count	5	27	100	20	152
		% within IT Skills at Start of study	71.4%	29.7%	30.3%	27.8%	30.4%
Total		Count	7	91	330	72	500
		% within IT Skills at Start of study	100.0%	100.0%	100.0%	100.0%	100.0%



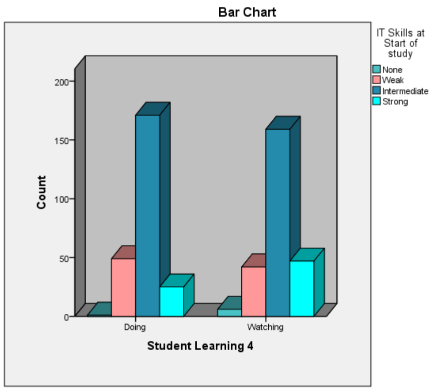
In the survey conducted 69.6% of students were **doing** (I am flexible and open minded) whilst 30.4% were **watching** (I am careful and cautious) at the start of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (3) = 5.827, p =0.120; H_0 = accepted

SL4: Doing - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it.

Student Learning 4 * IT Skills at Start of study Crosstabulation

			IT Skills at Start of study				Total
			None	Weak	Intermediate	Strong	
Student Learning 4	Doing	Count	1	49	171	25	246
		% within IT Skills at Start of study	14.3%	53.8%	51.8%	34.7%	49.2%
	Watching	Count	6	42	159	47	254
		% within IT Skills at Start of study	85.7%	46.2%	48.2%	65.3%	50.8%
Total		Count	7	91	330	72	500
		% within IT Skills at Start of study	100.0%	100.0%	100.0%	100.0%	100.0%



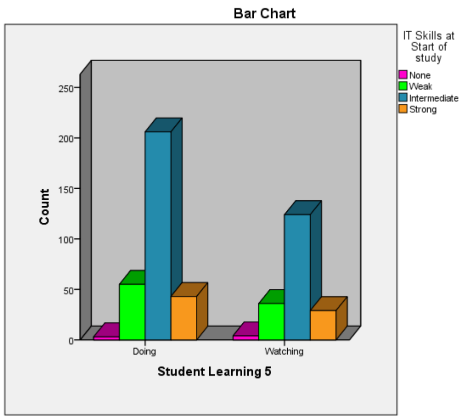
In the survey conducted 49.2% of students were **doing** (I like to try new and different things without too much preparation) whilst 50.8% were **watching** (I investigate a new topic or process in depth before trying it) at the start of their study. There is observable difference in the responses therefore H_0 has been rejected

χ^2 (3) = 11.143, p =0.011; H_0 = rejected

SL5: Doing - I am happy to have a go at new things. **Watching** - I draw up lists up possible courses of actions when starting a new project.

Student Learning 5 * IT Skills at Start of study Crosstabulation

			IT Skills at Start of study				Total
			None	Weak	Intermediate	Strong	
Student Learning 5	Doing	Count	3	55	206	43	307
		% within IT Skills at Start of study	42.9%	60.4%	62.4%	59.7%	61.4%
	Watching	Count	4	36	124	29	193
		% within IT Skills at Start of study	57.1%	39.6%	37.6%	40.3%	38.6%
Total		Count	7	91	330	72	500
		% within IT Skills at Start of study	100.0%	100.0%	100.0%	100.0%	100.0%



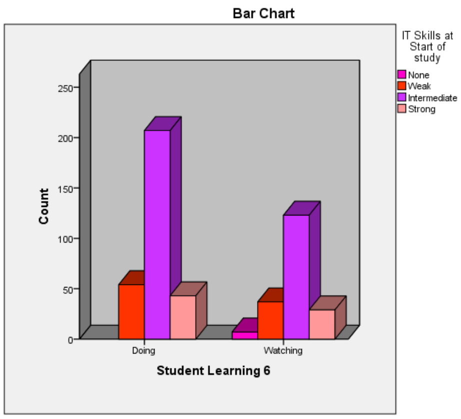
In the survey conducted 61.4% of students were **doing** (I am happy to have a go at new things) whilst 38.6% were **watching** (I draw up lists up possible courses of actions when starting a new project) at the start of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (3) = 1.283, p =0.733; H_0 = accepted

SL6: Doing - I like to get involved and to participate. **Watching** - I like to read and observe.

Student Learning 6 * IT Skills at Start of study Crosstabulation

			IT Skills at Start of study				Total
			None	Weak	Intermediate	Strong	
Student Learning 6	Doing	Count	0	54	207	43	304
		% within IT Skills at Start of study	0.0%	59.3%	62.7%	59.7%	60.8%
	Watching	Count	7	37	123	29	196
		% within IT Skills at Start of study	100.0%	40.7%	37.3%	40.3%	39.2%
Total		Count	7	91	330	72	500
		% within IT Skills at Start of study	100.0%	100.0%	100.0%	100.0%	100.0%



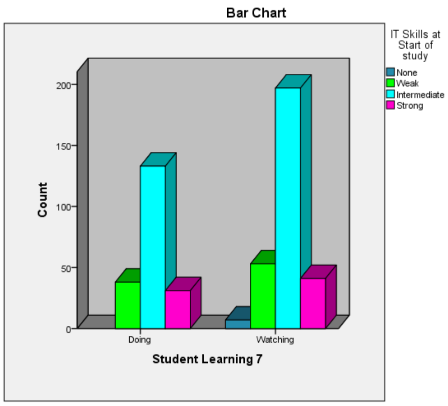
In the survey conducted 60.8% of students were **doing** (I like to get involved and to participate) whilst 39.2% were **watching** (I like to read and observe) at the start of their study. There is observable difference in the responses therefore H_0 has been rejected

χ^2 (3) = 11.488, p =0.009; H_0 = rejected

SL7: Doing - I am loud and outgoing. **Watching** - I am quiet and somewhat shy.

Student Learning 7 * IT Skills at Start of study Crosstabulation

			IT Skills at Start of study				Total
			None	Weak	Intermediate	Strong	
Student Learning 7	Doing	Count	0	38	133	31	202
		% within IT Skills at Start of study	0.0%	41.8%	40.3%	43.1%	40.4%
	Watching	Count	7	53	197	41	298
		% within IT Skills at Start of study	100.0%	58.2%	59.7%	56.9%	59.6%
Total		Count	7	91	330	72	500
		% within IT Skills at Start of study	100.0%	100.0%	100.0%	100.0%	100.0%



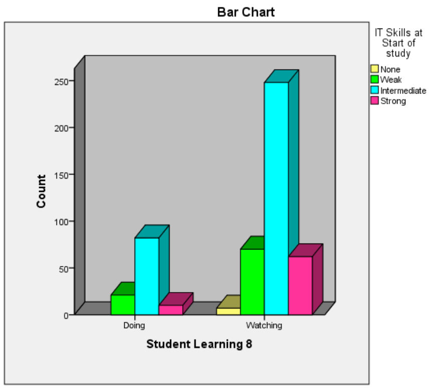
In the survey conducted 40.4% of students were **doing** (I am loud and outgoing) whilst 59.6% were **watching** (I am quiet and somewhat shy) at the start of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (3) = 5.027, p =0.170; H_0 = accepted

SL8: Doing - I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

Student Learning 8 * IT Skills at Start of study Crosstabulation

			IT Skills at Start of study				Total
			None	Weak	Intermediate	Strong	
Student Learning 8	Doing	Count	0	21	82	10	113
		% within IT Skills at Start of study	0.0%	23.1%	24.8%	13.9%	22.6%
	Watching	Count	7	70	248	62	387
		% within IT Skills at Start of study	100.0%	76.9%	75.2%	86.1%	77.4%
Total		Count	7	91	330	72	500
		% within IT Skills at Start of study	100.0%	100.0%	100.0%	100.0%	100.0%



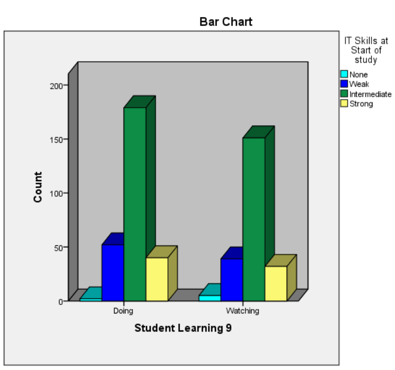
In the survey conducted 22.6% of students were **doing** (I make quick and bold decisions) whilst 77.4% were **watching** (I make cautious and logical decisions) at the start of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (3) = 6.133, p =0.105; H_0 = accepted

SL9: Doing - I speak fast, while thinking. **Watching** - I speak slowly, after thinking.

Student Learning 9 * IT Skills at Start of study Crosstabulation

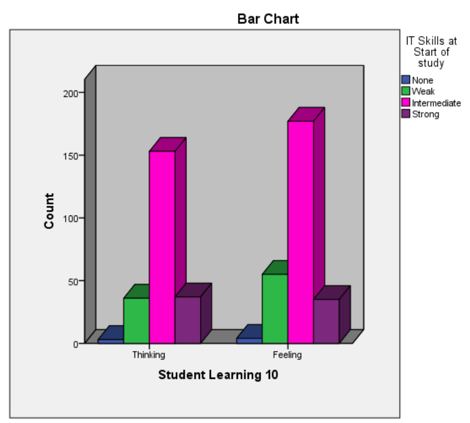
			IT Skills at Start of study				Total
			None	Weak	Intermediate	Strong	
Student Learning 9	Doing	Count	2	52	179	40	273
		% within IT Skills at Start of study	28.6%	57.1%	54.2%	55.6%	54.6%
	Watching	Count	5	39	151	32	227
		% within IT Skills at Start of study	71.4%	42.9%	45.8%	44.4%	45.4%
Total		Count	7	91	330	72	500
		% within IT Skills at Start of study	100.0%	100.0%	100.0%	100.0%	100.0%



In the survey conducted 54.6% of students were **doing** (I speak fast, while thinking) whilst 45.5% were **watching** (I speak slowly, after thinking) at the start of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (3) = 2.194, p =0.533; H_0 = accepted

SL10: Thinking - I ask probing questions when learning a new subject. **Feeling** - I am good at picking up hints and techniques from other people.



Student Learning 10 * IT Skills at Start of study Crosstabulation

			IT Skills at Start of study				Total
			None	Weak	Intermediate	Strong	
Student Learning 10	Thinking	Count	3	36	153	37	229
		% within IT Skills at Start of study	42.9%	39.6%	46.4%	51.4%	45.8%
	Feeling	Count	4	55	177	35	271
		% within IT Skills at Start of study	57.1%	60.4%	53.6%	48.6%	54.2%
Total		Count	7	91	330	72	500
		% within IT Skills at Start of study	100.0%	100.0%	100.0%	100.0%	100.0%

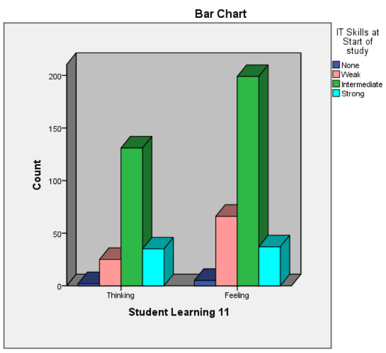
In the survey conducted 45.8% of students were **thinking** (I ask probing questions when learning a new subject) whilst 54.2% were **feeling** (I am good at picking up hints and techniques from other people) at the start of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (3) = 2.400, p =0.494; H_0 = accepted

SL11: Thinking - I am rational and logical. **Feeling** - I am practical and down to earth.

Student Learning 11 * IT Skills at Start of study Crosstabulation

			IT Skills at Start of study				Total
			None	Weak	Intermediate	Strong	
Student Learning 11	Thinking	Count	2	25	131	35	193
		% within IT Skills at Start of study	28.6%	27.5%	39.7%	48.6%	38.6%
	Feeling	Count	5	66	199	37	307
		% within IT Skills at Start of study	71.4%	72.5%	60.3%	51.4%	61.4%
Total		Count	7	91	330	72	500
		% within IT Skills at Start of study	100.0%	100.0%	100.0%	100.0%	100.0%



In the survey conducted 38.6% of students were **thinking** (I am rational and logical) whilst 61.4% were **feeling** (I am practical and down to earth) at the start of their study. There is observable difference in the responses therefore H_0 has been rejected

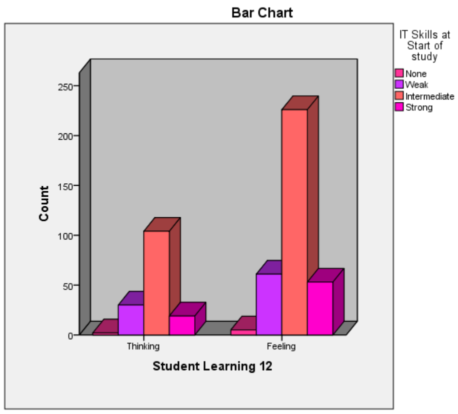
χ^2 (3) = 8.263, p =0.041; H_0 = rejected

SL12: Thinking - I plan events down to the last detail. **Feeling** - I like realistic, but flexible plans.

Student Learning 12 * IT Skills at Start of study Crosstabulation

			IT Skills at Start of study				Total
			None	Weak	Intermediate	Strong	
Student Learning 12	Thinking	Count	2	30	104	19	155
		% within IT Skills at Start of study	28.6%	33.0%	31.5%	26.4%	31.0%
	Feeling	Count	5	61	226	53	345

		% within IT Skills at Start of study	71.4%	67.0%	68.5%	73.6%	69.0%
Total		Count	7	91	330	72	500
		% within IT Skills at Start of study	100.0%	100.0%	100.0%	100.0%	100.0%



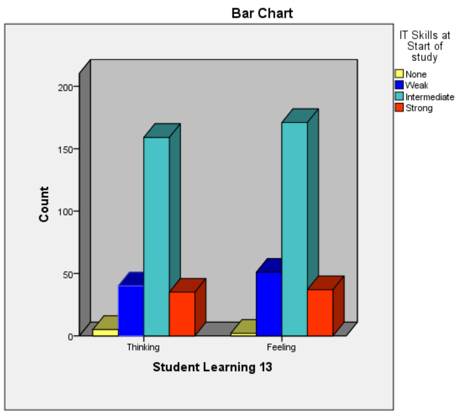
In the survey conducted 31% of students were **thinking** (I plan events down to the last detail) whilst 69% were **feeling** (I like realistic, but flexible plans) at the start of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (3) = 0.941, p =0.861; H_0 = accepted

SL13: Thinking - I like to know the right answers before trying something new. **Feeling** - I try things out by practicing to see if they work.

Student Learning 13 * IT Skills at Start of study Crosstabulation

			IT Skills at Start of study				Total
			None	Weak	Intermediate	Strong	
Student Learning 13	Thinking	Count	5	40	159	35	239
		% within IT Skills at Start of study	71.4%	44.0%	48.2%	48.6%	47.8%
	Feeling	Count	2	51	171	37	261
		% within IT Skills at Start of study	28.6%	56.0%	51.8%	51.4%	52.2%
Total		Count	7	91	330	72	500
		% within IT Skills at Start of study	100.0%	100.0%	100.0%	100.0%	100.0%



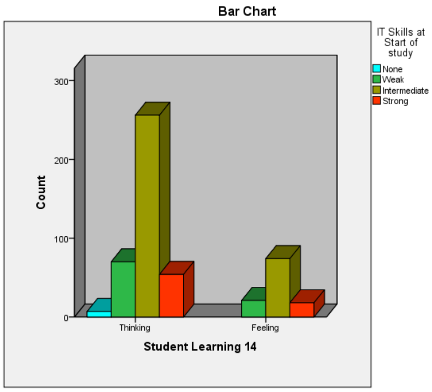
In the survey conducted 47.8% of students were **thinking** (I like to know the right answers before trying something new) whilst 52.2% were **feeling** (I try things out by practicing to see if they work) at the start of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (3) = 2.143, p =0.543; H_0 = accepted

SL14: Thinking - I analyze reports to find the basic assumptions and inconsistencies. **Feeling** - I rely upon others to give me the basic gist of reports.

Student Learning 14 * IT Skills at Start of study Crosstabulation

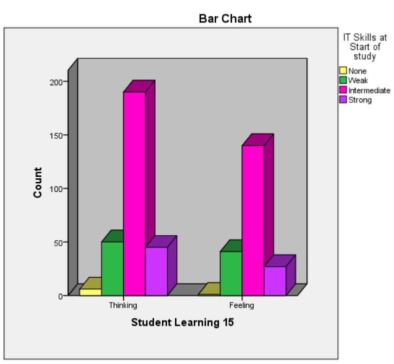
			IT Skills at Start of study				Total
			None	Weak	Intermediate	Strong	
Student Learning 14	Thinking	Count	7	70	256	54	387
		% within IT Skills at Start of study	100.0%	76.9%	77.6%	75.0%	77.4%
	Feeling	Count	0	21	74	18	113
		% within IT Skills at Start of study	0.0%	23.1%	22.4%	25.0%	22.6%
Total		Count	7	91	330	72	500
		% within IT Skills at Start of study	100.0%	100.0%	100.0%	100.0%	100.0%



In the survey conducted 77.4% of students were **thinking** (I analyze reports to find the basic assumptions and inconsistencies) whilst 22.6% were **feeling** (I rely upon others to give me the basic gist of reports) at the start of their study. There is no observable difference in the responses therefore H_0 has been accepted

$\chi^2(3) = 2.299$, $p = 0.513$; H_0 = accepted

SL15: Thinking - I prefer working alone. **Feeling** - I enjoy working with others.



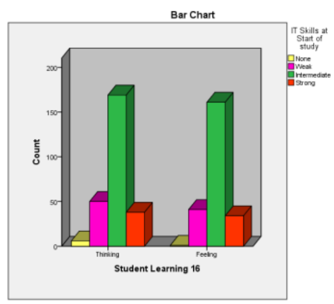
Student Learning 15 * IT Skills at Start of study Crosstabulation

			IT Skills at Start of study				Total
			None	Weak	Intermediate	Strong	
Student Learning 15	Thinking	Count	6	50	190	45	291
		% within IT Skills at Start of study	85.7%	54.9%	57.6%	62.5%	58.2%
	Feeling	Count	1	41	140	27	209
		% within IT Skills at Start of study	14.3%	45.1%	42.4%	37.5%	41.8%
Total		Count	7	91	330	72	500
		% within IT Skills at Start of study	100.0%	100.0%	100.0%	100.0%	100.0%

In the survey conducted 58.2% of students were **thinking (**I prefer working alone) whilst 41.8% were **feeling** (I enjoy working with others) at the start of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (3) = 3.175, p =0.365; H_0 = accepted

SL16: Thinking - Others would describe me as serious, reserved, and formal. **Feeling** - Others would describe me as verbal, expressive, and informal



Student Learning 16 * IT Skills at Start of study Crosstabulation

			IT Skills at Start of study				Total
			None	Weak	Intermediate	Strong	
Student Learning 16	Thinking	Count	6	50	169	38	263
		% within IT Skills at Start of study	85.7%	54.9%	51.2%	52.8%	52.6%
	Feeling	Count	1	41	161	34	237
		% within IT Skills at Start of study	14.3%	45.1%	48.8%	47.2%	47.4%
Total		Count	7	91	330	72	500
		% within IT Skills at Start of study	100.0%	100.0%	100.0%	100.0%	100.0%

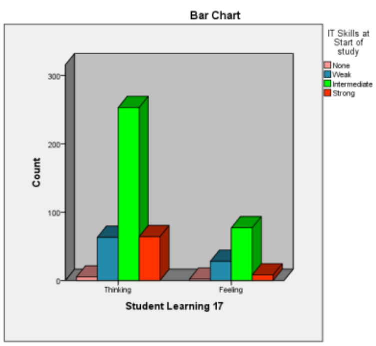
In the survey conducted 52.6% of students were **thinking** (Others would describe me as serious, reserved, and formal) whilst 47.4% were **feeling** (Others would describe me as verbal, expressive, and informal) at the start of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (3) = 3.535, p =0.316; H_0 = accepted

SL17: Thinking - I use facts to make decisions. **Feeling** - I use feelings to make decisions.

Student Learning 17 * IT Skills at Start of study Crosstabulation

			IT Skills at Start of study				Total
			None	Weak	Intermediate	Strong	
Student Learning 17	Thinking	Count	5	63	253	64	385
		% within IT Skills at Start of study	71.4%	69.2%	76.7%	88.9%	77.0%
	Feeling	Count	2	28	77	8	115
		% within IT Skills at Start of study	28.6%	30.8%	23.3%	11.1%	23.0%
Total		Count	7	91	330	72	500
		% within IT Skills at Start of study	100.0%	100.0%	100.0%	100.0%	100.0%



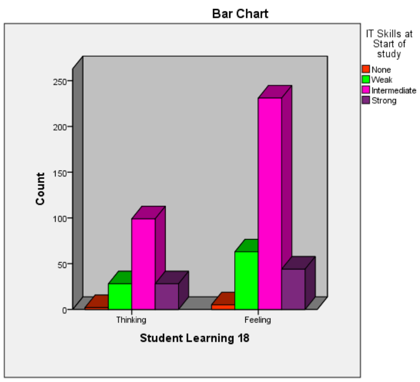
In the survey conducted 77% of students were **thinking** (I use facts to make decisions) whilst 23% were **feeling** (I use feelings to make decisions) at the start of their study. There is observable difference in the responses therefore H_0 has been rejected

χ^2 (3) = 8.991, p =0.029; H_0 = rejected

SL18: Thinking - I am difficult to get to know. **Feeling** - I am easy to get to know.

Student Learning 18 * IT Skills at Start of study Crosstabulation

			IT Skills at Start of study				Total
			None	Weak	Intermediate	Strong	
Student Learning 18	Thinking	Count	2	28	99	28	157
		% within IT Skills at Start of study	28.6%	30.8%	30.0%	38.9%	31.4%
	Feeling	Count	5	63	231	44	343
		% within IT Skills at Start of study	71.4%	69.2%	70.0%	61.1%	68.6%
Total		Count	7	91	330	72	500
		% within IT Skills at Start of study	100.0%	100.0%	100.0%	100.0%	100.0%

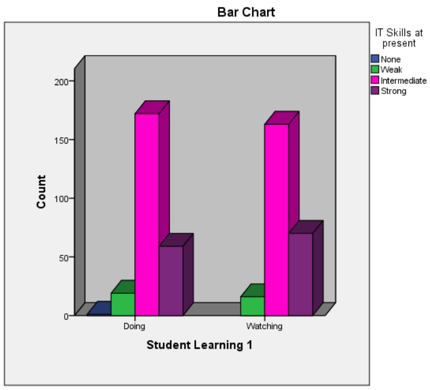


In the survey conducted 31.4% of students were **thinking** (I am difficult to get to know) whilst 68.6% were **feeling** (I am easy to get to know) at the start of their study. There is no observable difference in the responses therefore H_0 has been accepted

χ^2 (3) = 2.218, p =0.528; H_0 = accepted

The variables under consideration are level of IT at present and SL1 to SL18

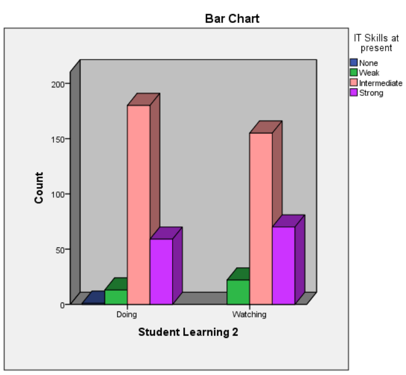
SL1: Doing - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical.



In the survey conducted 50.2% of students were doing (I often produce off-the-cuff ideas that at first might seem silly or half-baked) whilst 49.8% were watching (I am thorough and methodical) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted

$\chi^2(3) = 2.429$, $p = 0.488$; H_0 = accepted

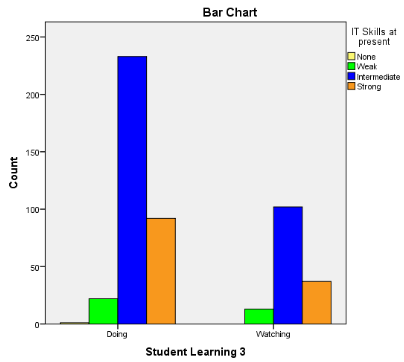
SL2: Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people.



In the survey conducted 50.6% of students were doing (I am normally the one who initiates conversations) whilst 49.4% were watching (I enjoy watching people) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted

$\chi^2(3) = 6.047$, $p = 0.109$; H_0 = accepted

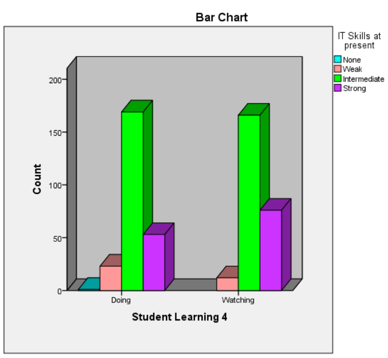
SL3: Doing - I am flexible and open minded. **Watching** - I am careful and cautious.



In the survey conducted 69.6% of students were doing (I am flexible and open minded) whilst 30.4% were watching (I am careful and cautious) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted.

$\chi^2(3) = 1.369$, $p = 0.713$; H_0 = accepted

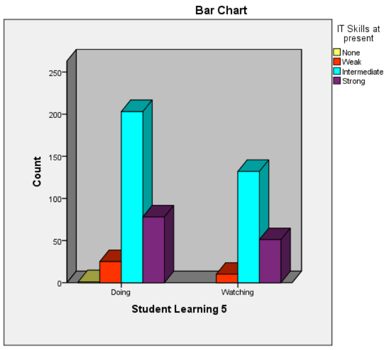
SL4: Doing - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it.



In the survey conducted 49.2% of students were doing (I like to try new and different things without too much preparation) whilst 50.8% were watching (I investigate a new topic or process in depth before trying it) at the present time of their study. There is observable difference in the responses therefore H_0 has been rejected

χ^2 (3) = 8.459, $p = 0.037$; H_0 = rejected

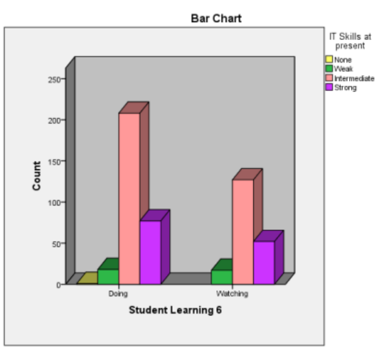
SL5: Doing - I am happy to have a go at new things. **Watching** - I draw up lists up possible courses of actions when starting a new project.



In the survey conducted 61.4% of students were doing (I am happy to have a go at new things) whilst 38.6% were watching (I draw up lists up possible courses of actions when starting a new project) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted.

χ^2 (3) = 2.253, p =0.522; H_0 = accepted

SL6: Doing - I like to get involved and to participate. **Watching** - I like to read and observe.



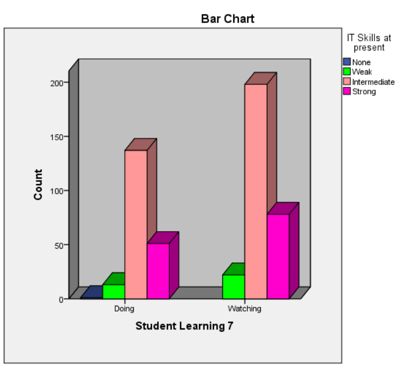
In the survey conducted 60.8% of students were doing (I like to get involved and to participate) whilst 39.2% were watching (I like to read and observe) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted.

χ^2 (3) = 2.235, p =0.525; H_0 = accepted

SL7: Doing - I am loud and outgoing. **Watching** - I am quiet and somewhat shy.

Student Learning 7 * IT Skills at present Crosstabulation

			IT Skills at present				Total
			None	Weak	Intermediate	Strong	
Student Learning 7	Doing	Count	1	13	137	51	202
		Expected Count	.4	14.1	135.3	52.1	202.0
		% within IT Skills at present	100.0%	37.1%	40.9%	39.5%	40.4%
	Watching	Count	0	22	198	78	298
		Expected Count	.6	20.9	199.7	76.9	298.0
		% within IT Skills at present	0.0%	62.9%	59.1%	60.5%	59.6%
Total		Count	1	35	335	129	500
		Expected Count	1.0	35.0	335.0	129.0	500.0
		% within IT Skills at present	100.0%	100.0%	100.0%	100.0%	100.0%



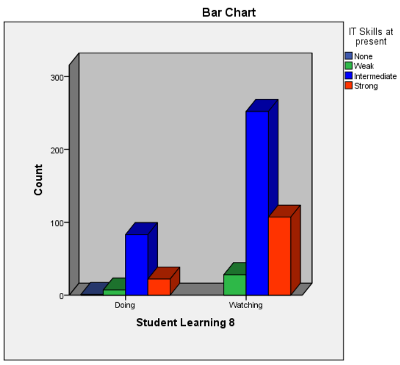
In the survey conducted 40.4% of students were doing (I am loud and outgoing) whilst 59.6% were watching (I am quiet and somewhat shy) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted.

χ^2 (3) = 1.704, p =0.636; H_0 = accepted

SL8: Doing - I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

Student Learning 8 * IT Skills at present Crosstabulation

			IT Skills at present				Total
			None	Weak	Intermediate	Strong	
Student Learning 8	Doing	Count	1	7	83	22	113
		Expected Count	.2	7.9	75.7	29.2	113.0
		% within IT Skills at present	100.0%	20.0%	24.8%	17.1%	22.6%
	Watching	Count	0	28	252	107	387
		Expected Count	.8	27.1	259.3	99.8	387.0
		% within IT Skills at present	0.0%	80.0%	75.2%	82.9%	77.4%
Total		Count	1	35	335	129	500
		Expected Count	1.0	35.0	335.0	129.0	500.0
		% within IT Skills at present	100.0%	100.0%	100.0%	100.0%	100.0%



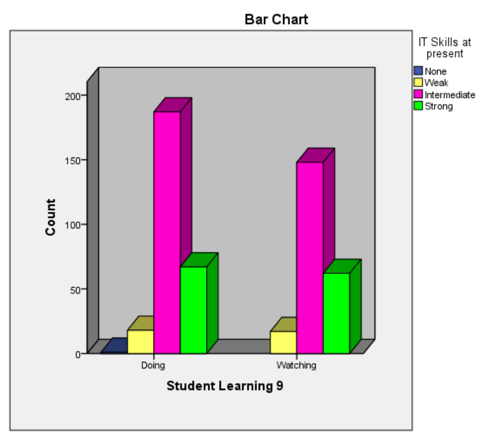
In the survey conducted 22.6% of students were doing (I make quick and bold decisions) whilst 77.4% were watching (I make cautious and logical decisions) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted.

χ^2 (3) = 6.735, p =0.081; H_0 = accepted

SL9: Doing - I speak fast, while thinking. **Watching** - I speak slowly, after thinking

Student Learning 9 * IT Skills at present Crosstabulation

			IT Skills at present				Total
			None	Weak	Intermediate	Strong	
Student Learning 9	Doing	Count	1	18	187	67	273
		Expected Count	.5	19.1	182.9	70.4	273.0
		% within IT Skills at present	100.0%	51.4%	55.8%	51.9%	54.6%
	Watching	Count	0	17	148	62	227
		Expected Count	.5	15.9	152.1	58.6	227.0
		% within IT Skills at present	0.0%	48.6%	44.2%	48.1%	45.4%
Total		Count	1	35	335	129	500
		Expected Count	1.0	35.0	335.0	129.0	500.0
		% within IT Skills at present	100.0%	100.0%	100.0%	100.0%	100.0%



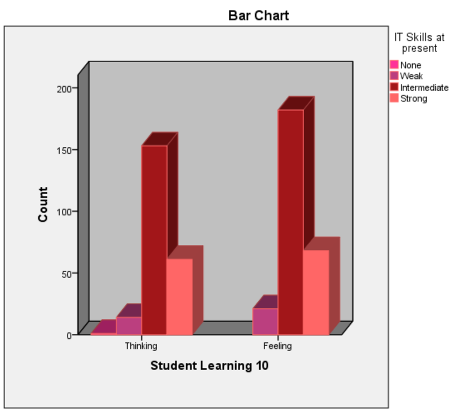
In the survey conducted 54.6% of students were doing (I speak fast, while thinking) whilst 45.4% were watching (I speak slowly, after thinking) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted.

χ^2 (3) = 1.544, p =0.672; H_0 = accepted

SL10: Thinking - I ask probing questions when learning a new subject. **Feeling** - I am good at picking up hints and techniques from other people.

Student Learning 10 * IT Skills at present Crosstabulation

			IT Skills at present				Total
			None	Weak	Intermediate	Strong	
Student Learning 10	Thinking	Count	1	14	153	61	229
		Expected Count	.5	16.0	153.4	59.1	229.0
		% within IT Skills at present	100.0%	40.0%	45.7%	47.3%	45.8%
	Feeling	Count	0	21	182	68	271
		Expected Count	.5	19.0	181.6	69.9	271.0
		% within IT Skills at present	0.0%	60.0%	54.3%	52.7%	54.2%
Total		Count	1	35	335	129	500
		Expected Count	1.0	35.0	335.0	129.0	500.0
		% within IT Skills at present	100.0%	100.0%	100.0%	100.0%	100.0%



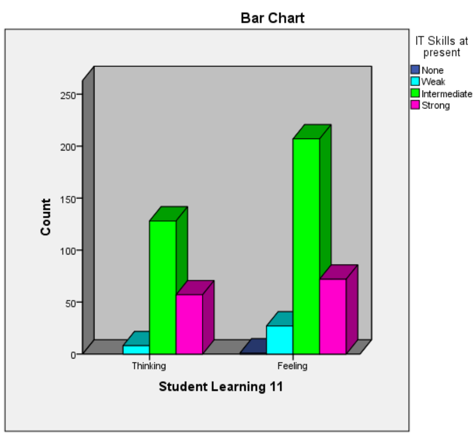
In the survey conducted 45.8% of students were thinking (I ask probing questions when learning a new subject) whilst 54.2% were feeling (I am good at picking up hints and techniques from other people) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted.

χ^2 (3) = 1.775, p =0.620; H_0 = accepted

SL11: Thinking - I am rational and logical. **Feeling** - I am practical and down to earth.

Student Learning 11 * IT Skills at present Crosstabulation

			IT Skills at present				Total
			None	Weak	Intermediate	Strong	
Student Learning 11	Thinking	Count	0	8	128	57	193
		Expected Count	.4	13.5	129.3	49.8	193.0
		% within IT Skills at present	0.0%	22.9%	38.2%	44.2%	38.6%
	Feeling	Count	1	27	207	72	307
		Expected Count	.6	21.5	205.7	79.2	307.0
		% within IT Skills at present	100.0%	77.1%	61.8%	55.8%	61.4%
Total		Count	1	35	335	129	500
		Expected Count	1.0	35.0	335.0	129.0	500.0
		% within IT Skills at present	100.0%	100.0%	100.0%	100.0%	100.0%



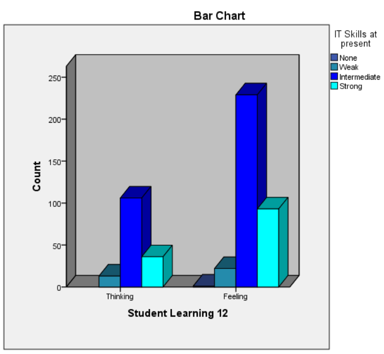
In the survey conducted 38.6% of students were thinking (I am rational and logical) whilst 61.4% were feeling (I am practical and down to earth) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted.

χ^2 (3) = 6.009, p =0.111; H_0 = accepted

SL12: Thinking - I plan events down to the last detail. **Feeling** - I like realistic, but flexible plans.

Student Learning 12 * IT Skills at present Crosstabulation

			IT Skills at present				Total
			None	Weak	Intermediate	Strong	
Student Learning 12	Thinking	Count	0	13	106	36	155
		Expected Count	.3	10.9	103.9	40.0	155.0
		% within IT Skills at present	0.0%	37.1%	31.6%	27.9%	31.0%
	Feeling	Count	1	22	229	93	345
		Expected Count	.7	24.2	231.2	89.0	345.0
		% within IT Skills at present	100.0%	62.9%	68.4%	72.1%	69.0%
Total		Count	1	35	335	129	500
		Expected Count	1.0	35.0	335.0	129.0	500.0
		% within IT Skills at present	100.0%	100.0%	100.0%	100.0%	100.0%



In the survey conducted 31% of students were thinking (I plan events down to the last detail) whilst 69% were feeling (I like realistic, but flexible plans) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted.

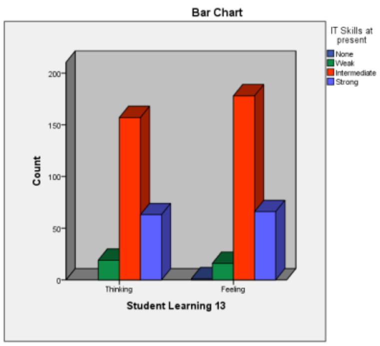
χ^2 (3) = 1.708, p =0.635; H_0 = accepted

SL13: Thinking - I like to know the right answers before trying something new. **Feeling** - I try things out by practicing to see if they work.

Student Learning 13 * IT Skills at present Crosstabulation

			IT Skills at present				Total
			None	Weak	Intermediate	Strong	
Student Learning 13	Thinking	Count	0	19	157	63	239
		Expected Count	.5	16.7	160.1	61.7	239.0
		% within IT Skills at present	0.0%	54.3%	46.9%	48.8%	47.8%
	Feeling	Count	1	16	178	66	261
		Expected Count	.5	18.3	174.9	67.3	261.0
		% within IT Skills at present	100.0%	45.7%	53.1%	51.2%	52.2%

Total	Count	1	35	335	129	500
	Expected Count	1.0	35.0	335.0	129.0	500.0
	% within IT Skills at present	100.0%	100.0%	100.0%	100.0%	100.0%



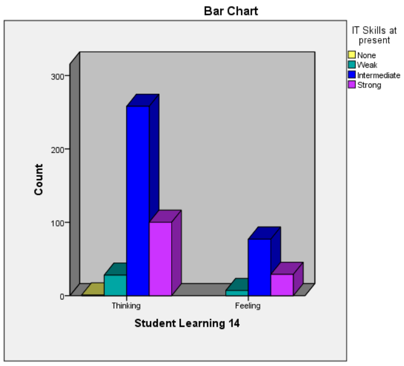
In the survey conducted 47.8% of students were thinking (I like to know the right answers before trying something new) whilst 52.2% were feeling (I try things out by practicing to see if they work) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted.

χ^2 (3) = 1.679, p =0.642; H_0 = accepted

SL14: Thinking - I analyze reports to find the basic assumptions and inconsistencies. **Feeling** - I rely upon others to give me the basic gist of reports.

Student Learning 14 * IT Skills at present Crosstabulation

			IT Skills at present				Total
			None	Weak	Intermediate	Strong	
Student Learning 14	Thinking	Count	1	28	258	100	387
		Expected Count	.8	27.1	259.3	99.8	387.0
		% within IT Skills at present	100.0%	80.0%	77.0%	77.5%	77.4%
	Feeling	Count	0	7	77	29	113
		Expected Count	.2	7.9	75.7	29.2	113.0
		% within IT Skills at present	0.0%	20.0%	23.0%	22.5%	22.6%
Total		Count	1	35	335	129	500
		Expected Count	1.0	35.0	335.0	129.0	500.0
		% within IT Skills at present	100.0%	100.0%	100.0%	100.0%	100.0%



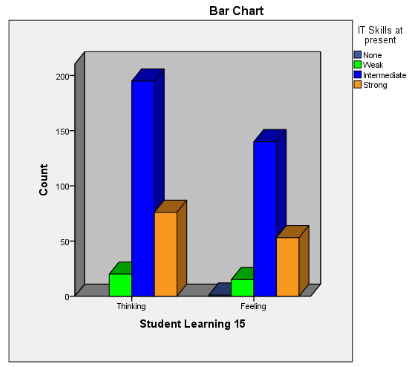
In the survey conducted 77.4% of students were thinking (I analyze reports to find the basic assumptions and inconsistencies) whilst 22.6% were feeling (I rely upon others to give me the basic gist of reports) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted.

χ^2 (3) = 0.457, p =0.928; H_0 = accepted

SL15: Thinking - I prefer working alone. **Feeling** - I enjoy working with others.

Student Learning 15 * IT Skills at present Crosstabulation

			IT Skills at present				Total
			None	Weak	Intermediate	Strong	
Student Learning 15	Thinking	Count	0	20	195	76	291
		Expected Count	.6	20.4	195.0	75.1	291.0
		% within IT Skills at present	0.0%	57.1%	58.2%	58.9%	58.2%
	Feeling	Count	1	15	140	53	209
		Expected Count	.4	14.6	140.0	53.9	209.0
		% within IT Skills at present	100.0%	42.9%	41.8%	41.1%	41.8%
Total		Count	1	35	335	129	500
		Expected Count	1.0	35.0	335.0	129.0	500.0
		% within IT Skills at present	100.0%	100.0%	100.0%	100.0%	100.0%



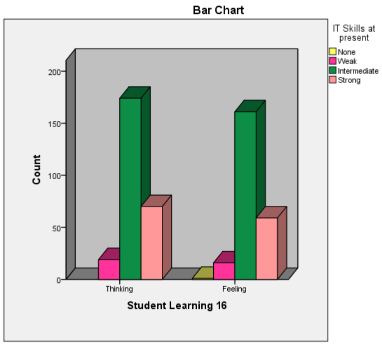
In the survey conducted 58.2% of students were thinking (I prefer working alone) whilst 41.8% were feeling (I enjoy working with others) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted.

χ^2 (3) = 1.436, p =0.697; H_0 = accepted

SL16: Thinking - Others would describe me as serious, reserved, and formal. **Feeling** - Others would describe me as verbal, expressive, and informal.

Student Learning 16 * IT Skills at present Crosstabulation

			IT Skills at present				Total
			None	Weak	Intermediate	Strong	
Student Learning 16	Thinking	Count	0	19	174	70	263
		Expected Count	.5	18.4	176.2	67.9	263.0
		% within IT Skills at present	0.0%	54.3%	51.9%	54.3%	52.6%
	Feeling	Count	1	16	161	59	237
		Expected Count	.5	16.6	158.8	61.1	237.0
		% within IT Skills at present	100.0%	45.7%	48.1%	45.7%	47.4%
Total		Count	1	35	335	129	500
		Expected Count	1.0	35.0	335.0	129.0	500.0
		% within IT Skills at present	100.0%	100.0%	100.0%	100.0%	100.0%



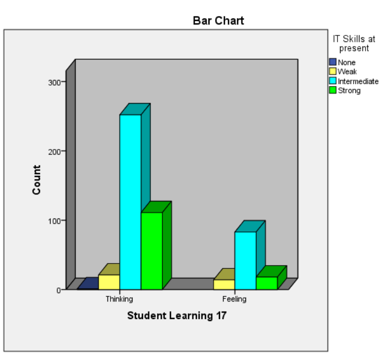
In the survey conducted 52.6% of students were thinking (Others would describe me as serious, reserved, and formal) whilst 47.4% were feeling (Others would describe me as verbal, expressive, and informal) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted.

χ^2 (3) = 1.351, p =0.717; H_0 = accepted

SL17: Thinking - I use facts to make decisions. **Feeling** - I use feelings to make decisions.

Student Learning 17 * IT Skills at present Crosstabulation

			IT Skills at present				Total
			None	Weak	Intermediate	Strong	
Student Learning 17	Thinking	Count	1	21	252	111	385
		Expected Count	.8	27.0	258.0	99.3	385.0
		% within IT Skills at present	100.0%	60.0%	75.2%	86.0%	77.0%
	Feeling	Count	0	14	83	18	115
		Expected Count	.2	8.1	77.1	29.7	115.0
		% within IT Skills at present	0.0%	40.0%	24.8%	14.0%	23.0%
Total		Count	1	35	335	129	500
		Expected Count	1.0	35.0	335.0	129.0	500.0
		% within IT Skills at present	100.0%	100.0%	100.0%	100.0%	100.0%



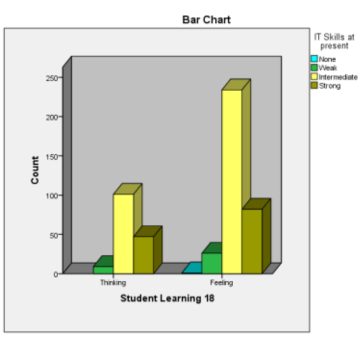
In the survey conducted 77% of students were thinking (I use facts to make decisions whilst 23% were feeling (I use feelings to make decisions) at the present time of their study. There is observable difference in the responses therefore H_0 has been rejected

χ^2 (3) = 12.568, p =0.006; H_0 = rejected

SL18: Thinking - I am difficult to get to know. **Feeling** - I am easy to get to know.

Student Learning 18 * IT Skills at present Crosstabulation

			IT Skills at present				Total
			None	Weak	Intermediate	Strong	
Student Learning 18	Thinking	Count	0	9	101	47	157
		Expected Count	.3	11.0	105.2	40.5	157.0
		% within IT Skills at present	0.0%	25.7%	30.1%	36.4%	31.4%
	Feeling	Count	1	26	234	82	343
		Expected Count	.7	24.0	229.8	88.5	343.0
		% within IT Skills at present	100.0%	74.3%	69.9%	63.6%	68.6%
Total		Count	1	35	335	129	500
		Expected Count	1.0	35.0	335.0	129.0	500.0
		% within IT Skills at present	100.0%	100.0%	100.0%	100.0%	100.0%



In the survey conducted 31.4% of students were thinking (I am difficult to get to know) whilst 68.6% were feeling (I am easy to get to know) at the present time of their study. There is no observable difference in the responses therefore H_0 has been accepted.

χ^2 (3) = 2.744, p =0.433; H_0 = accepted

SECTION 2: Doing and Learning

The two variables used were

SL1: Doing - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical and **SL2: Doing** - I am normally the one who initiates conversations. **Watching** - I enjoy watching people.

χ^2 (1) = 1.566, p =0.211; H_0 = accepted. There is no observable difference in the responses therefore H_0 has been accepted.

In the survey conducted there is 53% within SL2 and 53.4% within the SL1 for the doing component of the variable whereas for the watching component 52.6% within the SL2 and 52.2% in SL1 where in SL1 - I am thorough and methodical and in SL2 I enjoy watching people. The figures indicate that there is a slightly higher percentage for doing however, it is not a significant variation and as such the H_0 has been accepted between the variables SL1 and SL2

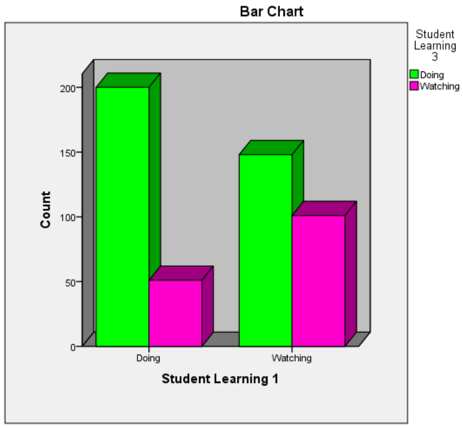
		SL2	
SL1		**Doing**	**Watching**
	Doing	53%	47.4%
	Watching	47%	52.6%

Doing and Watching % within Student Learning 1

		SL2	
SL1		**Doing**	**Watching**
	Doing	53.4%	46.6%
	Watching	47.8%	52.2%

Doing and Watching % within Student Learning 2

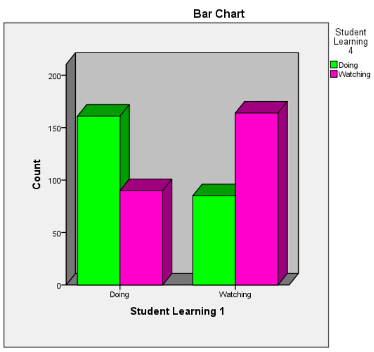
		SL2		
		Doing	Watching	**TOTAL**
	Doing	134	117	**251**
	Watching	119	130	**249**
	TOTAL	**253**	**247**	**500**



χ^2 (1) = 24.210, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected.

Students are doing more than watching in both SL1 and SL3 variables by significant percentages.

SL1: Doing - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical and **SL4: Doing** - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it.



SL1	SL4		
		Doing	**Watching**
	Doing	64.1%	35.9%
	Watching	34.1%	65.9%

Doing and Watching % within Student Learning 1

SL1	SL4		
		Doing	**Watching**
	Doing	65.4%	35.4%
	Watching	34.6%	64.6%

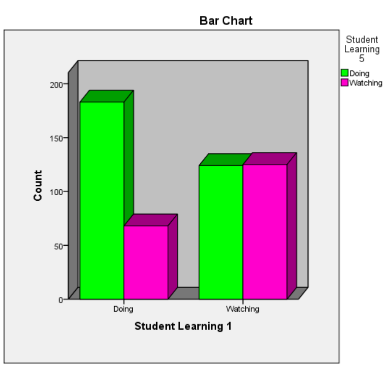
Doing and Watching % within Student Learning4

SL1	SL4			
		Doing	Watching	**TOTAL**
	Doing	161	90	**251**
	Watching	85	164	**249**
	TOTAL	**246**	**254**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning4

χ^2 (1) = 45.031, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected.

SL1: Doing - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical and **SL5**: **Doing** - I am happy to have a go at new things. **Watching** - I draw up lists up possible courses of actions when starting a new project.



SL1	SL5		
		Doing	**Watching**
	Doing	72.9%	27.1%

	Watching	49.8%	50.2%

Doing and Watching % within Student Learning 1

	SL5		
SL1		**Doing**	**Watching**
	Doing	59.6%	35.2%
	Watching	40.4%	64.8%

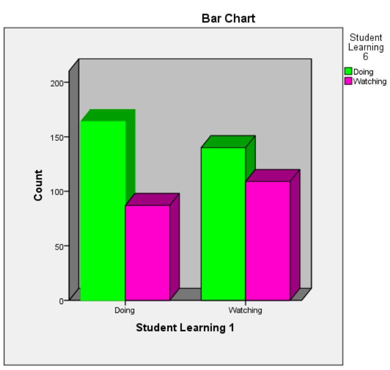
Doing and Watching % within Student Learning5

	SL5			
SL1		Doing	Watching	**TOTAL**
	Doing	183	68	**251**
	Watching	124	125	**249**
	TOTAL	**307**	**193**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning5

χ^2 (1) = 28.165, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected.

SL1: Doing - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical and **SL6: Doing** - I like to get involved and to participate. **Watching** - I like to read and observe



	SL6		
SL1		**Doing**	**Watching**
	Doing	65.3%	34.7 %
	Watching	56.2%	43.8%

Doing and Watching % within Student Learning 1

	SL6		
SL1		**Doing**	**Watching**

	Doing	53.9%	44.4%
	Watching	46.1%	55.6%

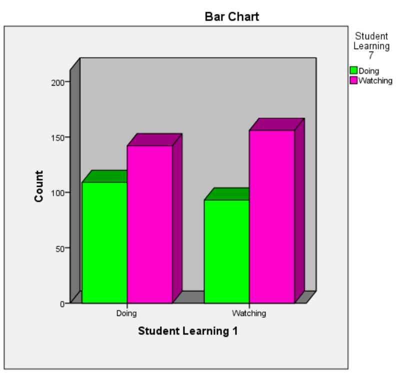
Doing and Watching % within Student Learning6

	SL6			
SL1		Doing	Watching	**TOTAL**
	Doing	164	87	**251**
	Watching	140	109	**249**
	TOTAL	**304**	**196**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning6

χ^2 (1) = 4.356, p =0.037; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected.

SL1: Doing - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical and **SL7: Doing** - I am loud and outgoing. **Watching** - I am quiet and somewhat shy.



	SL7	
SL1	**Doing**	**Watching**
Doing	43.4 %	56.6%
Watching	37.3%	62.7%

Doing and Watching % within Student Learning 1

	SL7	
SL1	**Doing**	**Watching**
Doing	54%	47.7%
Watching	46%	52.3%

Doing and Watching % within Student Learning6

	SL7			
SL1		Doing	Watching	**TOTAL**
	Doing	109	142	**251**
	Watching	93	156	**249**
	TOTAL	**202**	**298**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning7

χ^2 (1) = 1.917, p =0.166; H_0 = accepted. There is observable difference in the responses therefore H_0 has been accepted

SL1: Doing - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical and **SL8: Doing** - I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

	SL8		
SL1		**Doing**	**Watching**
	Doing	31.5%	68.5%
	Watching	13.7%	86.3%

Doing and Watching % within Student Learning 1

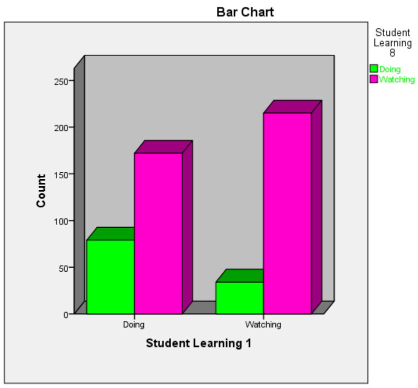
	SL8		
SL1		**Doing**	**Watching**
	Doing	69.9%	44.4%
	Watching	30.1%	55.6%

Doing and Watching % within Student Learning6

	SL8			
SL1		Doing	Watching	**TOTAL**
	Doing	79	172	**251**
	Watching	34	215	**249**
	TOTAL	**113**	**387**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning8

χ^2 (1) = 22.690, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected.



SL1: Doing - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical and **SL9: Doing** - I speak fast, while thinking. **Watching** - I speak slowly, after thinking.

	SL8		
SL1		**Doing**	**Watching**
	Doing	59.5 %	40.2%
	Watching	49.4%	50.6%

Doing and Watching % within Student Learning 1

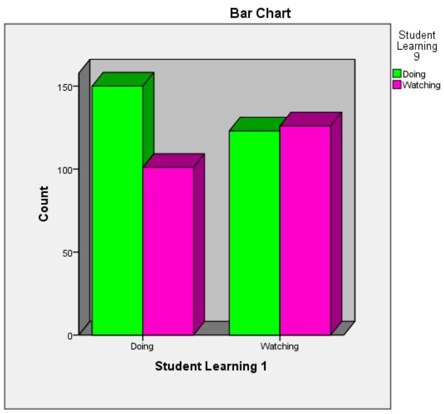
	SL8		
SL1		**Doing**	**Watching**
	Doing	54.9 %	44.5%
	Watching	45.1%	55.5%

Doing and Watching % within Student Learning6

	SL8			
SL1		Doing	Watching	**TOTAL**
	Doing	150	101	**251**
	Watching	123	126	**249**
	TOTAL	**273**	**227**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning9

χ^2 (1) = 4.356, p =0.037; H_0 = rejected. There is observable difference in the responses H_0 has been rejected.

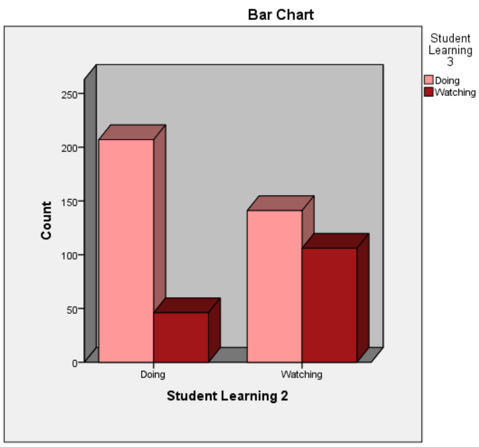


Section 2		Q8 – SL1 [df=1]				
		Critical value	χ^2	**P Value**	**Y/N**	H_0
	Q9 – SL2	1.642	1.566	.211	N	Accept
	Q10 – SL3		24.210	.000	Y	Reject
	Q11 – SL4		45.031	.001	Y	Reject
	Q12- SL5		28.165	.000	Y	Reject
	Q13 – SL6	3.841	4.356	.037	Y	Reject
	Q14 – SL7	1.642	1.917	.166	N	Accept
	Q15 – SL8		22.690	.000	Y	Reject
	Q16A – SL9	5.024	5.416	.020	Y	Reject

The two variables used were

SL2: Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people and **SL3: Doing** - I am flexible and open minded. **Watching** - I am careful and cautious.

χ^2 (1) = 36.135, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected.



SL2	SL3		
		Doing	**Watching**
	Doing	81.8%	18.2%
	Watching	57.1%	42.9%

Doing and Watching % within Student Learning 2

SL2	SL3		
		Doing	**Watching**
	Doing	59.3%	30.3 %
	Watching	40.5%	69.7%

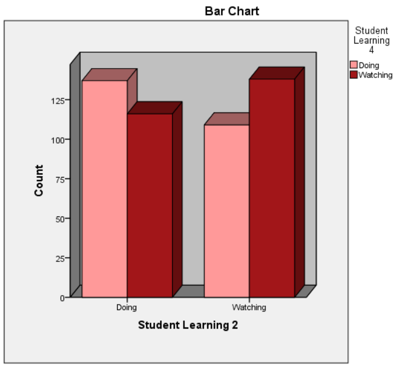
Doing and Watching % within Student Learning3

SL2	SL3			
		Doing	Watching	**TOTAL**
	Doing	207	46	**253**
	Watching	141	106	**247**
	TOTAL	**348**	**152**	**500**

Total Count Doing and Watching: Student Learning2 and Student Learning3

SL2: Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people and **SL4: Doing** - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it.

χ^2 (1) = 5.021, p =0.025; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected.



	SL4		
		Doing	**Watching**
SL2	**Doing**	54.2%	45.8%
	Watching	44.1%	55.9 %

Doing and Watching % within Student Learning 2

	SL4		
		Doing	**Watching**
SL2	**Doing**	55.7 %	45.7 %
	Watching	44.3%	54.3 %

Doing and Watching % within Student Learning4

	SL4			
		Doing	Watching	**TOTAL**
SL2	Doing	**137**	**116**	**253**
	Watching	**109**	**138**	**247**
	TOTAL	**246**	**254**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning4

SL2: Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people and **SL5: Doing** - I am happy to have a go at new things. **Watching** - I draw up lists up possible courses of actions when starting a new project.

χ^2 (1) = 11.752, p =0.001; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected.

SL2	SL5		
		Doing	**Watching**
	Doing	68.8 %	31.2%
	Watching	53.8%	46.2%

Doing and Watching % within Student Learning 2

SL2	SL5		
		Doing	**Watching**
	Doing	56.7 %	40.9 %
	Watching	43.3%	59.1%

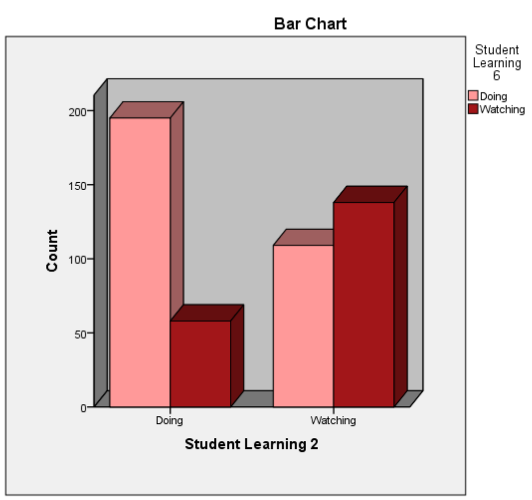
Doing and Watching % within Student Learning5

SL2	SL5			
		Doing	Watching	**TOTAL**
	Doing	174	79	**253**
	Watching	133	114	**247**
	TOTAL	**307**	**193**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning5

SL2: Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people and **SL6: Doing** - I like to get involved and to participate. **Watching** - I like to read and observe

χ^2 (1) = 56.918, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected.



SL2	SL6		
		Doing	**Watching**
	Doing	77.1%	22.9%
	Watching	44.1%	55.9 %

Doing and Watching % within Student Learning 2

SL2	SL6		
		Doing	**Watching**
	Doing	64.1 %	29.6%
	Watching	35.9%	70.4%

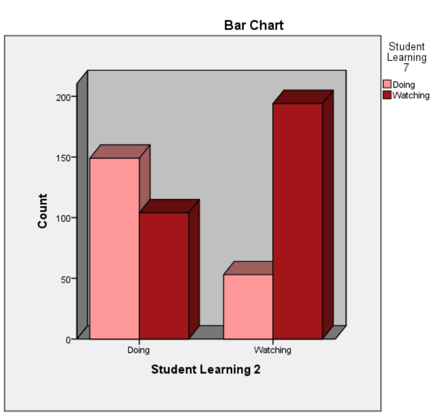
Doing and Watching % within Student Learning6

SL2	SL6			
		Doing	Watching	**TOTAL**
	Doing	195	58	**253**
	Watching	109	138	**247**
	TOTAL	**304**	**196**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning6

SL2: Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people and **SL7: Doing** - I am loud and outgoing. **Watching** - I am quiet and somewhat shy.

χ^2 (1) = 72.743, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected.



	SL7		
SL2		**Doing**	**Watching**
	Doing	58.9 %	41.1 %
	Watching	73.8%	34.9%

Doing and Watching % within Student Learning 2

	SL7		
SL2		**Doing**	**Watching**
	Doing	21.5%	78.5%
	Watching	26.2%	65.1%

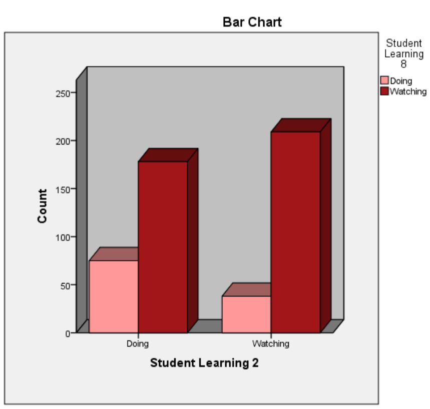
Doing and Watching % within Student Learning7

	SL7			
SL2		Doing	Watching	**TOTAL**
	Doing	149	104	**253**
	Watching	53	194	**247**
	TOTAL	**202**	**298**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning7

SL2: Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people and **SL8: Doing** - I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

χ^2 (1) = 14.528, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



		SL8	
SL2		**Doing**	**Watching**
	Doing	29.6%	70.4%
	Watching	66.4%	46.0%

Doing and Watching % within Student Learning 2

		SL8	
SL2		**Doing**	**Watching**
	Doing	66.4%	46.0%
	Watching	33.6%	54.0%

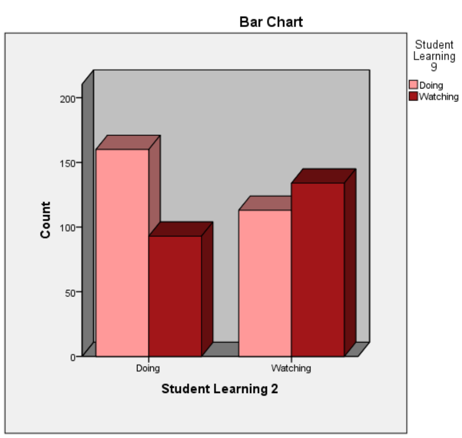
Doing and Watching % within Student Learning8

		SL8		
SL2		Doing	Watching	**TOTAL**
	Doing	75	178	**253**
	Watching	38	209	**247**
	TOTAL	**113**	**387**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning8

SL2: Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people and **SL9: Doing** - I speak fast, while thinking. **Watching** - I speak slowly, after thinking.

χ^2 (1) = 15.427, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL2	SL9		
		Doing	**Watching**
	Doing	63.2%	36.8 %
	Watching	45.7%	54.3%

Doing and Watching % within Student Learning 2

SL2	SL9		
		Doing	**Watching**
	Doing	58.6%	54.3%
	Watching	41.4%	59.0%

Doing and Watching % within Student Learning9

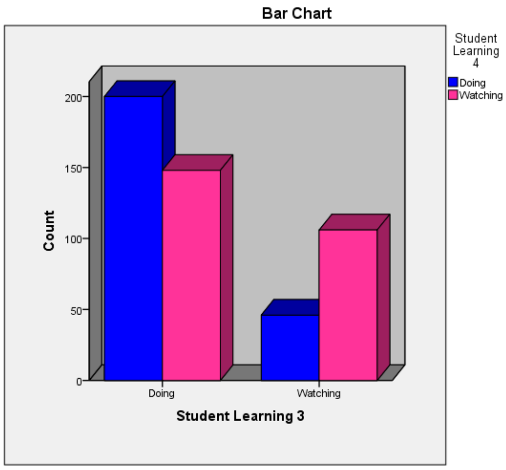
SL2	SL9			
		Doing	Watching	**TOTAL**
	Doing	160	93	**253**
	Watching	113	134	**247**
	TOTAL	**273**	**227**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning9

Section 2		Q9 – SL2 [df=1]				
		Critical value	χ^2	**P Value**	**Y/N**	H_0
	Q8 – SL1	1.642	1.566	.211	N	Accept
	Q10 – SL3		36.135	.000	Y	Reject
	Q11 – SL4	6.635	5.021	.021	Y	Reject
	Q12- SL5		11.752	.001	Y	Reject
	Q13 – SL6		56.918	.000	Y	Reject
	Q14 – SL7		72.743	.000	Y	Reject
	Q15 – SL8		14.528	.000	Y	Reject
	Q16A – SL9		15.427	.000	Y	Reject

SL3: Doing - I am flexible and open minded. **Watching** - I am careful and cautious **SL4: Doing** - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it.

χ^2 (1) = 31.334, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL3	SL4		
		Doing	**Watching**
	Doing	57.5%	42.5 %
	Watching	30.3%	69.7 %

Doing and Watching % within Student Learning 3

SL3	SL4		
		Doing	**Watching**
	Doing	81.3 %	58.3 %
	Watching	18.7 %	41.7 %

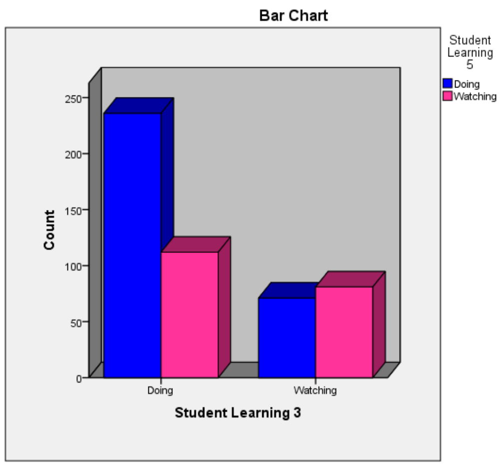
Doing and Watching % within Student Learning4

SL3	SL4			
		Doing	Watching	**TOTAL**
	Doing	200	148	**348**
	Watching	46	106	**152**
	TOTAL	**246**	**254**	**500**

Total Count Doing and Watching: Student Learning3 and Student Learning4

SL3: **Doing** - I am flexible and open minded. **Watching** - I am careful and cautious **SL5:** **Doing** - I am happy to have a go at new things. **Watching** - I draw up lists up possible courses of actions when starting a new project

χ^2 (1) = 19.888, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL3	SL5		
		Doing	**Watching**
	Doing	67.8%	32.2%
	Watching	46.7%	53.3%

Doing and Watching % within Student Learning 3

SL3	SL5		
		Doing	**Watching**
	Doing	76.9%	58.0%
	Watching	23.1%	42.0%

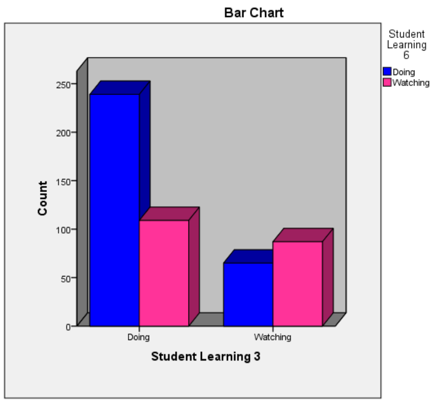
Doing and Watching % within Student Learning5

SL3	SL5			
		Doing	Watching	**TOTAL**
	Doing	236	112	**348**
	Watching	71	81	**152**
	TOTAL	**307**	**193**	**500**

Total Count Doing and Watching: Student Learning3 and Student Learning5

SL3: **Doing** - I am flexible and open minded. **Watching** - I am careful and cautious
SL6: **Doing –** I like to get involved and to participate. **Watching** - I like to read and observe

χ^2 (1) = 29.810, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL3	SL6		
		Doing	**Watching**
	Doing	68.7 %	31.3%
	Watching	42.8%	57.2%

Doing and Watching % within Student Learning 3

SL3	SL6		
		Doing	**Watching**
	Doing	78.6 %	55.6 %
	Watching	21.4 %	44.4 %

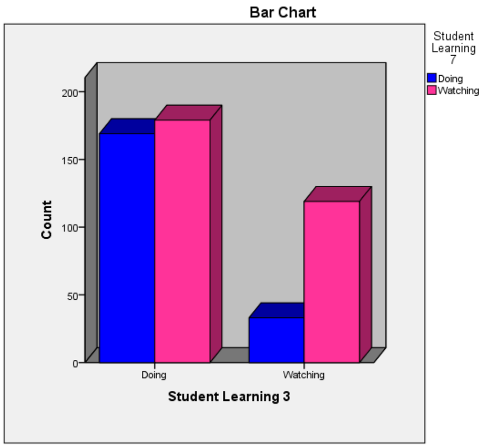
Doing and Watching % within Student Learning6

SL3	SL6			
		Doing	Watching	**TOTAL**
	Doing	239	109	**348**
	Watching	65	87	**152**
	TOTAL	**304**	**196**	**500**

Total Count Doing and Watching: Student Learning3 and Student Learning6

SL3: **Doing** - I am flexible and open minded. **Watching** - I am careful and cautious
SL7: **Doing** - I am loud and outgoing. **Watching** - I am quiet and somewhat shy

χ^2 (1) = 29.810, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL3	SL7		
		Doing	**Watching**
	Doing	48.6%	51.4 %
	Watching	21.7 %	78.3 %

Doing and Watching % within Student Learning 3

SL3	SL7		
		Doing	**Watching**
	Doing	83.7 %	60.1 %
	Watching	16.3 %	39.9 %

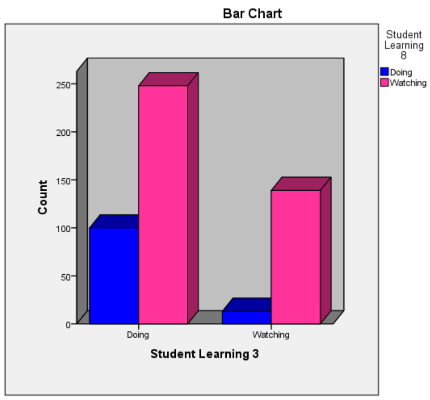
Doing and Watching % within Student Learning7

SL3	SL7			
		Doing	Watching	**TOTAL**
	Doing	169	179	**348**
	Watching	33	119	**152**
	TOTAL	**202**	**298**	**500**

Total Count Doing and Watching: Student Learning3 and Student Learning7

SL3: Doing - I am flexible and open minded. **Watching** - I am careful and cautious **SL8: Doing** - I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

χ^2 (1) = 24.636, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



	SL8		
		Doing	**Watching**
SL3	**Doing**	28.7 %	71.3 %
	Watching	8.6 %	91.4 %

Doing and Watching % within Student Learning 3

	SL8		
		Doing	**Watching**
SL3	**Doing**	88.5%	64.1%
	Watching	11.5%	35.9%

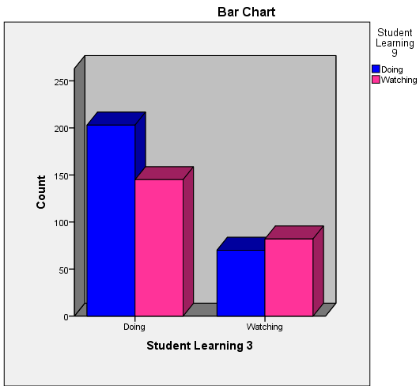
Doing and Watching % within Student Learning8

	SL8			
		Doing	Watching	**TOTAL**
SL3	Doing	100	248	**348**
	Watching	13	139	**152**
	TOTAL	**113**	**387**	**500**

Total Count Doing and Watching: Student Learning3 and Student Learning8

SL3: **Doing** - I am flexible and open minded. **Watching** - I am careful and cautious **SL9:** **Doing** - I speak fast, while thinking. **Watching** - I speak slowly, after thinking.

χ^2 (1) = 6.437, p =0.011; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL3	SL9		
		Doing	**Watching**
	Doing	58.3%	41.7%
	Watching	46.1%	53.9%

Doing and Watching % within Student Learning 3

SL3	SL9		
		Doing	**Watching**
	Doing	74.4%	63.9%
	Watching	25.6%	36.1%

Doing and Watching % within Student Learning9

SL3	SL9			
		Doing	Watching	**TOTAL**
	Doing	203	145	**348**
	Watching	70	82	**152**
	TOTAL	**273**	**227**	**500**

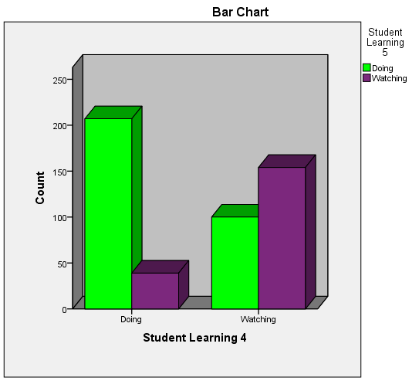
Total Count Doing and Watching: Student Learning3 and Student Learning9

Section 2						
		Q10 – SL3 [df=1]				
		Critical value	χ^2	**P Value**	**Y/N**	H_0
	Q8 – SL1		24.210	.000	Y	Reject
	Q9 – SL2	1.642	1.566	.211	N	Accept
	Q11 – SL4		31.334	.000	Y	Reject
	Q12- SL5		19.883	.000	Y	Reject
	Q13 – SL6		29.810	.000	Y	Reject

	Q14 – SL7		31.681	.000	N	Accept
	Q15 – SL8		24.636	.000	Y	Reject
	Q16A – SL9	6.635	6.437	.011	Y	Reject

SL4: **Doing** - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it **SL5:** **Doing** - I am happy to have a go at new things. **Watching** - I draw up lists up possible courses of actions when starting a new project.

χ^2 (1) = 105.716, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL4	SL5		
		Doing	**Watching**
	Doing	84.1 %	15.9 %
	Watching	39.4 %	60.6 %

Doing and Watching % within Student Learning 4

SL4	SL5		
		Doing	**Watching**
	Doing	67.4 %	20.2 %
	Watching	32.6 %	79.8 %

Doing and Watching % within Student Learning5

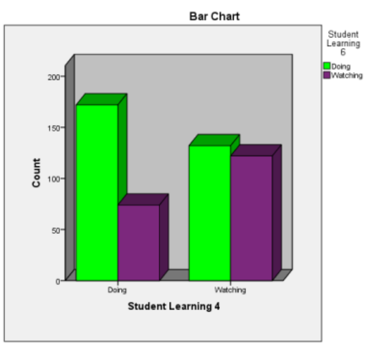
SL4	SL5			
		Doing	Watching	**TOTAL**
	Doing	207	39	**246**
	Watching	100	154	**254**

	TOTAL	**307**	**193**	**500**

Total Count Doing and Watching: Student Learning4 and Student Learning5

SL4: Doing - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it **SL6: Doing** - I like to get involved and to participate. **Watching** - I like to read and observe

χ^2 (1) = 16.895, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



	SL6		
		Doing	**Watching**
SL4	**Doing**	69.9 %	30.1 %
	Watching	52.0 %	48.0 %

Doing and Watching % within Student Learning 4

	SL6		
		Doing	**Watching**
SL4	**Doing**	56.6 %	37.8 %
	Watching	43.4 %	62.2%

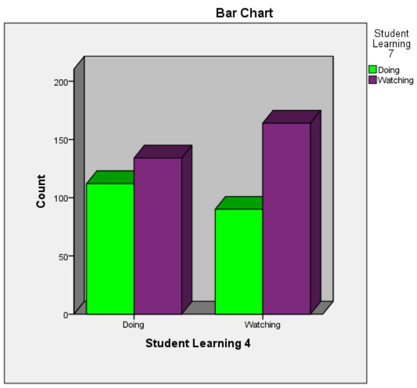
Doing and Watching % within Student Learning6

	SL6			
		Doing	Watching	**TOTAL**
SL4	Doing	172	74	**246**
	Watching	132	122	**254**
	TOTAL	**304**	**196**	**500**

Total Count Doing and Watching: Student Learning4 and Student Learning6

SL4: Doing - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it **SL7: Doing** - I am loud and outgoing. **Watching** - I am quiet and somewhat shy.

χ^2 (1) = 5.290, p =0.021; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



	SL7		
SL4		**Doing**	**Watching**
	Doing	45.5 %	54.5 %
	Watching	35.4 %	64.6 %

Doing and Watching % within Student Learning 4

	SL7		
SL4		**Doing**	**Watching**
	Doing	55.4 %	45.0 %
	Watching	44.6 %	55.5 %

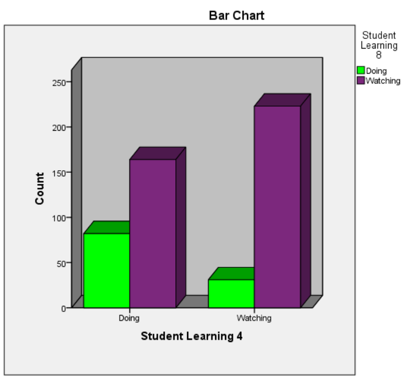
Doing and Watching % within Student Learning7

	SL7			
SL4		Doing	Watching	**TOTAL**
	Doing	112	134	**246**
	Watching	90	164	**254**
	TOTAL	**202**	**298**	**500**

Total Count Doing and Watching: Student Learning4 and Student Learning7

SL4: Doing - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it **SL8: Doing** – I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

χ^2 (1) = 31.893, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



	SL8		
SL4		**Doing**	**Watching**
	Doing	33.3 %	66.7 %
	Watching	12.2%	87.8 %

Doing and Watching % within Student Learning 4

	SL8		
SL4		**Doing**	**Watching**
	Doing	72.6 %	42.4 %
	Watching	27.4 %	57.6 %

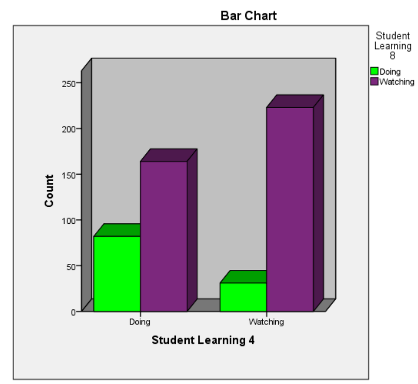
Doing and Watching % within Student Learning8

	SL8			
SL4		Doing	Watching	**TOTAL**
	Doing	82	164	**246**
	Watching	31	223	**254**
	TOTAL	**113**	**387**	**500**

Total Count Doing and Watching: Student Learning4 and Student Learning8

SL4: Doing - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it **SL9: Doing** – I speak fast, while thinking. **Watching** - I speak slowly, after thinking.

χ^2 (1) = 12.508, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL4	SL9		
		Doing	**Watching**
	Doing	62.6 %	37.4 %
	Watching	46.9 %	53.1 %

Doing and Watching % within Student Learning 4

SL4	SL9		
		Doing	**Watching**
	Doing	56.4 %	40.5 %
	Watching	43.6 %	59.5 %

Doing and Watching % within Student Learning9

SL4	SL9			
		Doing	Watching	**TOTAL**
	Doing	154	92	**246**
	Watching	119	135	**254**
	TOTAL	**273**	**227**	**500**

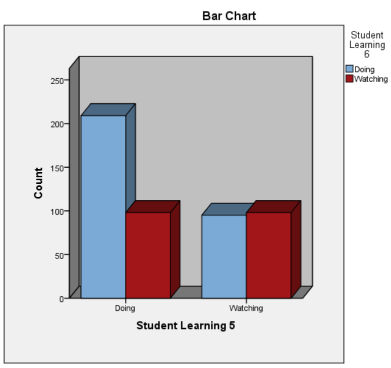
Total Count Doing and Watching: Student Learning4 and Student Learning9

Sectio						
		Q11 – SL4 [df=1]				
		Critical	χ^2	**P Value**	**Y/N**	H_0

		value				
	Q8 – SL1		45.031	.001	Y	Reject
	Q9 – SL2	5.024	5.021	.025	Y	Reject
	Q10 – SL3		31.334	.000	Y	Reject
	Q12- SL5		105.716	.000	Y	Reject
	Q13 – SL6		16.895	.000	Y	Reject
	Q14 – SL7	5.024	5.290	.021	Y	Reject
	Q15 – SL8		31.893	.000	Y	Reject
	Q16A – SL9		12.508	.000	Y	Reject

SL5: Doing - I am happy to have a go at new things. **Watching** - I draw up lists of possible courses of actions when starting a new project **SL6: Doing** – I like to get involved and to participate. **Watching** - I like to read and observe

χ^2 (1) = 17.677, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL5	SL6		
		Doing	Watching
	Doing	68.1 %	31.9 %
	Watching	49.2 %	50.8 %

Doing and Watching % within Student Learning 5

SL5	SL6		
		Doing	Watching
	Doing	68.8%	50.0 %
	Watching	31.2 %	50.0 %

Doing and Watching % within Student Learning6

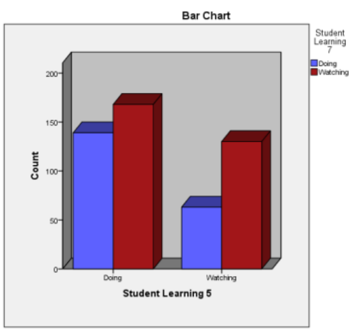
S L	SL6

		Doing	Watching	**TOTAL**
	Doing	209	98	**246**
	Watching	95	98	**254**
	TOTAL	**304**	**196**	**500**

Total Count Doing and Watching: Student Learning5 and Student Learning6

SL5: Doing - I am happy to have a go at new things. **Watching** - I draw up lists of possible courses of actions when starting a new project **SL7: Doing** - I am loud and outgoing. **Watching** - I am quiet and somewhat shy

χ^2 (1) = 7.856, p =0.005; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL5	**SL7**		
		Doing	**Watching**
	Doing	45.3 %	54.7 %
	Watching	32.6 %	67.4%

Doing and Watching % within Student Learning 5

SL5	**SL7**		
		Doing	**Watching**
	Doing	68.8 %	56.4 %
	Watching	31.2 %	43.6 %

Doing and Watching % within Student Learning7

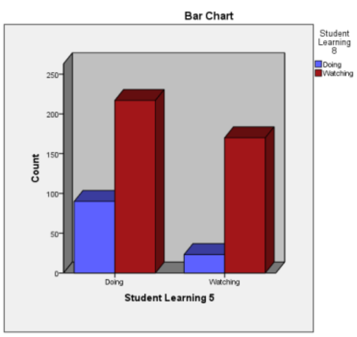
SL5	**SL7**			
		Doing	Watching	**TOTAL**

	Doing	139	168	**246**
	Watching	63	130	**254**
	TOTAL	**202**	**298**	**500**

Total Count Doing and Watching: Student Learning5 and Student Learning7

SL5: Doing - I am happy to have a go at new things. **Watching** - I draw up lists of possible courses of actions when starting a new project **SL8: Doing** - I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

χ^2 (1) = 20.508, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



	SL8		
SL5		**Doing**	**Watching**
	Doing	29.3 %	70.7 %
	Watching	11.9 %	88.1 %

Doing and Watching % within Student Learning 5

	SL8		
SL5		**Doing**	**Watching**
	Doing	79.6 %	56.1 %
	Watching	20.4 %	43.9%

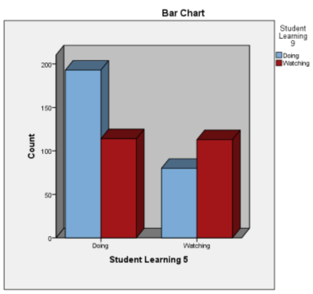
Doing and Watching % within Student Learning8

	SL8			
SL5		Doing	Watching	**TOTAL**
	Doing	90	217	**246**
	Watching	23	170	**254**
	TOTAL	**113**	**387**	**500**

Total Count Doing and Watching: Student Learning5 and Student Learning8

SL5: Doing - I am happy to have a go at new things. **Watching** - I draw up lists of possible courses of actions when starting a new project **SL9: Doing** - I speak fast, while thinking. **Watching** - I speak slowly, after thinking

χ^2 (1) = 21.925, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



	SL9		
SL5		**Doing**	**Watching**
	Doing	62.9 %	37.1 %
	Watching	41.5 %	58.5 %

Doing and Watching % within Student Learning 5

	SL9		
SL5		**Doing**	**Watching**
	Doing	70.7 %	50.2 %
	Watching	29.3 %	49.8 %

Doing and Watching % within Student Learning9

	SL9			
SL5		Doing	Watching	**TOTAL**
	Doing	193	114	**246**
	Watching	80	113	**254**
	TOTAL	**273**	**227**	**500**

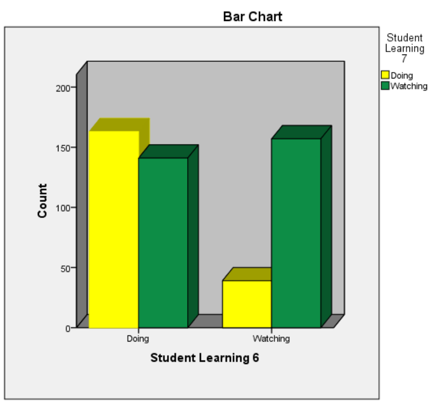
Total Count Doing and Watching: Student Learning5 and Student Learning9

Section 2		Q12 – SL5 [df=1]				
		Critical value	χ^2	P Value	Y/N	H_0
	Q8 – SL1		28.165	.000	Y	Reject
	Q9 – SL2		11.752	.001	Y	Reject
	Q10 – SL3		19.883	.000	Y	Reject
	Q11- SL4		105.716	.000	Y	Reject
	Q13 – SL6		17.677	.000	Y	Reject
	Q14 – SL7	6.635	7.856	.005	Y	Reject
	Q15 – SL8		20.508	.000	Y	Reject
	Q16A – SL9		21.925	.000	Y	Reject

SL6: **Doing** – I like to get involved and to participate. **Watching** - I like to read and observe

SL7: **Doing** - I am loud and outgoing. **Watching** - I am quiet and somewhat shy

χ^2 (1) = 56.275, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



L6	SL7		
		Doing	**Watching**
	Doing	53.6 %	46.4 %
	Watching	19.9 %	80.1 %

Doing and Watching % within Student Learning 6

	SL7		
		Doing	**Watching**
SL6	**Doing**	80.7 %	47.3 %
	Watching	19.3 %	52.7 %

Doing and Watching % within Student Learning9

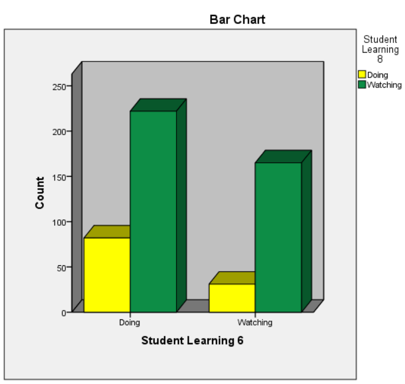
	SL7			
		Doing	Watching	**TOTAL**
SL6	Doing	163	141	**246**
	Watching	39	157	**254**
	TOTAL	**202**	**298**	**500**

Total Count Doing and Watching: Student Learning6 and Student Learning9

SL6: Doing – I like to get involved and to participate. **Watching** - I like to read and observe

SL8: Doing - I make quick and bold decisions. **Watching** - I make cautious and logical decisions

χ^2 (1) = 8.481, p =0.004; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



	SL8		
		Doing	**Watching**
SL6	**Doing**	27.0 %	73.0 %
	Watching	15.8 %	84.2 %

Doing and Watching % within Student Learning 6

SL6	SL8		
		Doing	**Watching**
	Doing	72.8 %	57.4 %
	Watching	27.4 %	42.6 %

Doing and Watching % within Student Learning8

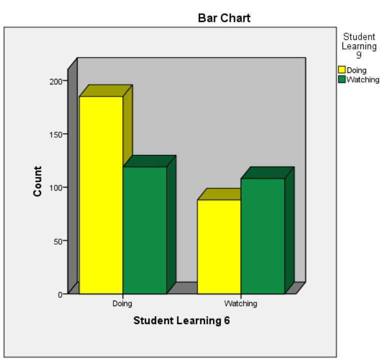
SL6	SL8			
		Doing	Watching	**TOTAL**
	Doing	82	222	**246**
	Watching	31	165	**254**
	TOTAL	**113**	**387**	**500**

Total Count Doing and Watching: Student Learning6 and Student Learning8

SL6: **Doing** – I like to get involved and to participate. **Watching** - I like to read and observe

SL9: **Doing** - I speak fast, while thinking. **Watching** - I speak slowly, after thinking

χ^2 (1) = 12.241, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL6	SL9		
		Doing	**Watching**
	Doing	60.9 %	39.1 %
	Watching	44.9 %	55.1 %

Doing and Watching % within Student Learning 6

SL6		SL9	
		Doing	**Watching**
	Doing	67.8 %	52.4 %
	Watching	32.2 %	47.6 %

Doing and Watching % within Student Learning9

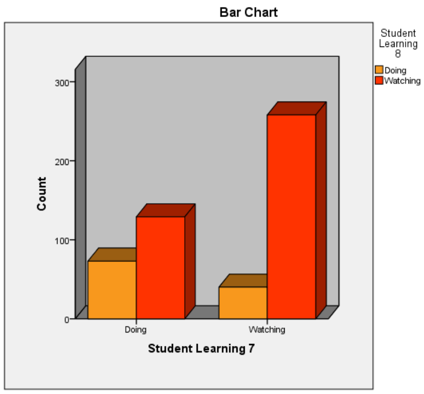
SL6		SL9		
		Doing	Watching	**TOTAL**
	Doing	185	119	**246**
	Watching	88	108	**254**
	TOTAL	**273**	**227**	**500**

Total Count Doing and Watching: Student Learning6 and Student Learning9

Section 2		Q13 – SL6 [df=1]				
		Critical value	χ^2	**P Value**	**Y/N**	H_0
	Q8 – SL1	3.841	4.356	.037	Y	Reject
	Q9 – SL2		56.918	.000	Y	Reject
	Q10 – SL3		29.810	.000	Y	Reject
	Q11- SL4		16.895	.000	Y	Reject
	Q12 – SL5		17.677	.000	Y	Reject
	Q14 – SL7		56.275	.000	Y	Reject
	Q15 – SL8		8.481	.004	Y	Reject
	Q16A – SL9		12.241	.000	Y	Reject

SL7: **Doing** - I am loud and outgoing. **Watching** - I am quiet and somewhat shy **SL8:** **Doing** - I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

χ^2 (1) = 35.514, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



		SL8	
SL7		**Doing**	**Watching**
	Doing	36.1 %	63.9 %
	Watching	13.4 %	86.6 %

Doing and Watching % within Student Learning 7

		SL8	
SL7		**Doing**	**Watching**
	Doing	64.6 %	33.3 %
	Watching	35.4 %	66.7 %

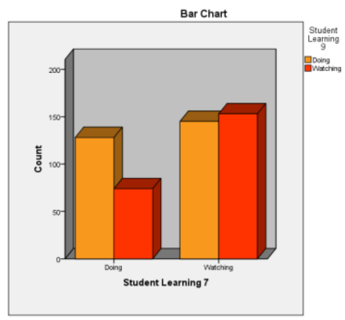
Doing and Watching % within Student Learning8

		SL8		
SL7		Doing	Watching	**TOTAL**
	Doing	73	129	**202**
	Watching	40	258	**298**
	TOTAL	**113**	**387**	**500**

Total Count Doing and Watching: Student Learning7 and Student Learning8

SL7: **Doing** - I am loud and outgoing. **Watching** - I am quiet and somewhat shy **SL9:** **Doing** - I speak fast, while thinking. **Watching** - I speak slowly, after thinking

χ^2 (1) = 10.507, p =0.001; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



	SL9		
		Doing	**Watching**
SL7	**Doing**	63.4 %	36.6 %
	Watching	48.7 %	51.3 %

Doing and Watching % within Student Learning 7

	SL9		
		Doing	**Watching**
SL7	**Doing**	46.9 %	32.6 %
	Watching	53.1 %	67.4 %

Doing and Watching % within Student Learning9

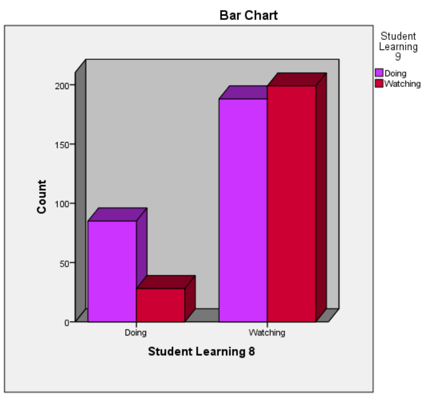
	SL9			
		Doing	Watching	**TOTAL**
SL7	Doing	128	74	**202**
	Watching	145	153	**298**
	TOTAL	**273**	**227**	**500**

Total Count Doing and Watching: Student Learning7 and Student Learning9

		Q14 – SL7 [df=1]				
		Critical value	χ^2	**P Value**	**Y/N**	H_0
Section 2	Q8 – SL1	1.642	1.917	.166	N	Accept
	Q9 – SL2		72.743	.000	Y	Reject
	Q10 – SL3		31.681	.000	Y	Reject
	Q11- SL4	1.642	5.290	.021	Y	Reject
	Q12 – SL5	6.635	7.856	.005	Y	Reject
	Q13 – SL6		56.275	.000	Y	Reject
	Q15 – SL8		35.514	.000	Y	Reject
	Q16A – SL9		10.507	.001	Y	Reject

SL8: **Doing** - I make quick and bold decisions. **Watching** - I make cautious and logical decisions **SL9: Doing** - I speak fast, while thinking. **Watching** - I speak slowly, after thinking

χ^2 (1) = 25.045, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL8	SL9		
		Doing	**Watching**
	Doing	75.2 %	24.8 %
	Watching	48.6 %	51.4 %

Doing and Watching % within Student Learning 8

SL8	SL9		
		Doing	**Watching**
	Doing	31.1 %	12.3 %
	Watching	68.9 %	87.7 %

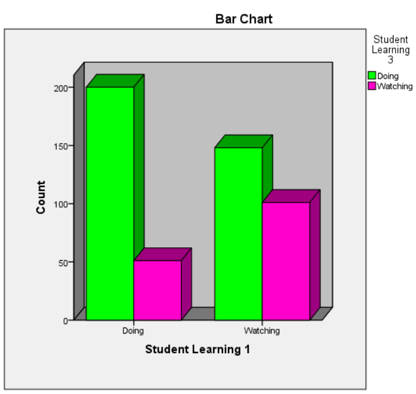
Doing and Watching % within Student Learning9

SL8	SL			
		Doing	Watching	**TOTAL**
	Doing	85	28	**113**
	Watching	188	199	**387**
	TOTAL	**273**	**227**	**500**

Total Count Doing and Watching: Student Learning8 and Student Learning9

		Q15 – SL8 [df=1]				
		Critical value	χ^2	P Value	Y/N	H_0
Section 2	Q8 – SL1		22.690	.000	Y	Reject
	Q9 – SL2		14.528	.000	Y	Reject
	Q10 – SL3		24.636	.000	Y	Reject
	Q11- SL4		31.893	.000	Y	Reject
	Q12 – SL5		20.504	.000	Y	Reject
	Q13 – SL6		8.481	.004	Y	Reject
	Q14 – SL7		35.514	.000	Y	Reject
	Q16A – SL9		25.045	.000	Y	Reject

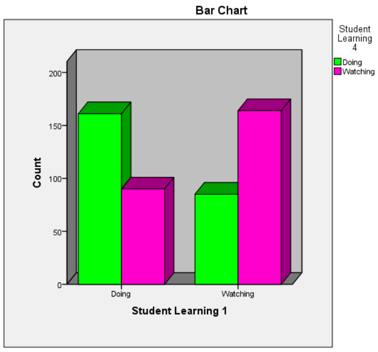
otal Count Doing and Watching: Student Learning1 and Student Learning3



χ^2 (1) = 24.210, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected.

Students are doing more than watching in both SL1 and SL3 variables by significant percentages.

SL1: Doing - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical and **SL4: Doing** - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it.



SL1	SL4		
		Doing	**Watching**
	Doing	64.1%	35.9%
	Watching	34.1%	65.9%

Doing and Watching % within Student Learning 1

SL1	SL4		
		Doing	**Watching**
	Doing	65.4%	35.4%
	Watching	34.6%	64.6%

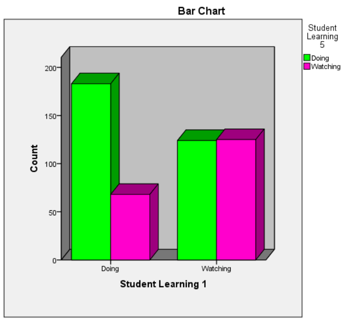
Doing and Watching % within Student Learning4

SL1	SL4			
		Doing	Watching	**TOTAL**
	Doing	161	90	**251**
	Watching	85	164	**249**
	TOTAL	**246**	**254**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning4

χ^2 (1) = 45.031, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected.

SL1: Doing - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical and **SL5**: **Doing** - I am happy to have a go at new things. **Watching** - I draw up lists up possible courses of actions when starting a new project.



SL1	SL5		
		Doing	**Watching**
	Doing	72.9%	27.1%
	Watching	49.8%	50.2%

Doing and Watching % within Student Learning 1

SL1	SL5		
		Doing	**Watching**
	Doing	59.6%	35.2%
	Watching	40.4%	64.8%

Doing and Watching % within Student Learning5

SL1	SL5			
		Doing	Watching	**TOTAL**
	Doing	183	68	**251**
	Watching	124	125	**249**
	TOTAL	**307**	**193**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning5

χ^2 (1) = 28.165, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected.

SL1: Doing - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical and **SL6: Doing** - I like to get involved and to participate. **Watching** - I like to read and observe

	SL6		
		Doing	**Watching**
	Doing	65.3%	34.7 %
	Watching	56.2%	43.8%

Doing and Watching % within Student Learning 1

	SL6		
SL1		**Doing**	**Watching**
	Doing	53.9%	44.4%
	Watching	46.1%	55.6%

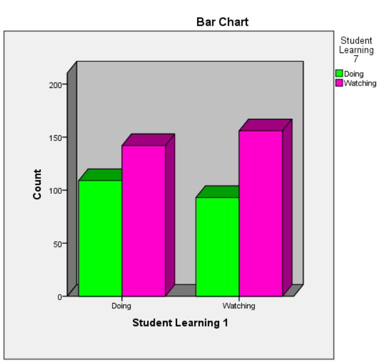
Doing and Watching % within Student Learning6

	SL6			
SL1		Doing	Watching	**TOTAL**
	Doing	164	87	**251**
	Watching	140	109	**249**
	TOTAL	**304**	**196**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning6

χ^2 (1) = 4.356, p =0.037; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected.

SL1: Doing - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical and **SL7: Doing** - I am loud and outgoing. **Watching** - I am quiet and somewhat shy.



	SL7		
SL1		**Doing**	**Watching**

	Doing	43.4 %	56.6%
	Watching	37.3%	62.7%

Doing and Watching % within Student Learning 1

SL1	SL7		
		Doing	**Watching**
	Doing	54%	47.7%
	Watching	46%	52.3%

Doing and Watching % within Student Learning6

SL1	SL7			
		Doing	Watching	**TOTAL**
	Doing	109	142	**251**
	Watching	93	156	**249**
	TOTAL	**202**	**298**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning7

χ^2 (1) = 1.917, p =0.166; H_0 = accepted. There is observable difference in the responses therefore H_0 has been accepted

SL1: Doing - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical and **SL8: Doing** - I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

SL1	SL8		
		Doing	**Watching**
	Doing	31.5%	68.5%
	Watching	13.7%	86.3%

Doing and Watching % within Student Learning 1

SL1	SL8		
		Doing	**Watching**
	Doing	69.9%	44.4%
	Watching	30.1%	55.6%

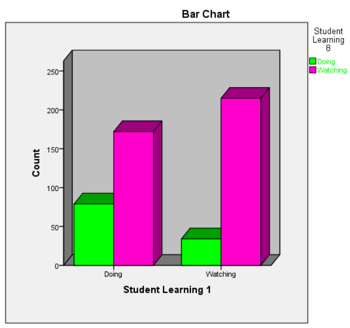
Doing and Watching % within Student Learning6

SL1	SL8			
		Doing	Watching	**TOTAL**
	Doing	79	172	**251**

	Watching	34	215	**249**
	TOTAL	**113**	**387**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning8

χ^2 (1) = 22.690, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected.



SL1: Doing - I often produce off-the-cuff ideas that at first might seem silly or half-baked. **Watching** - I am thorough and methodical and **SL9: Doing** - I speak fast, while thinking. **Watching** - I speak slowly, after thinking.

		SL8	
SL1		**Doing**	**Watching**
	Doing	59.5 %	40.2%
	Watching	49.4%	50.6%

Doing and Watching % within Student Learning 1

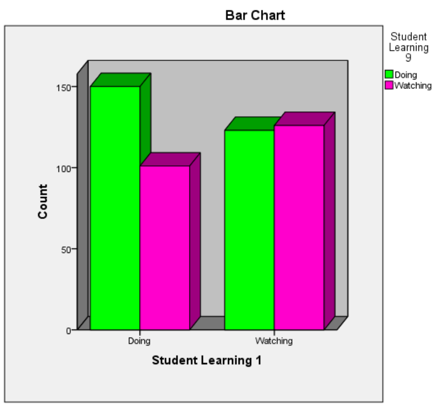
		SL8	
SL1		**Doing**	**Watching**
	Doing	54.9 %	44.5%
	Watching	45.1%	55.5%

Doing and Watching % within Student Learning6

		SL8		
SL1		Doing	Watching	**TOTAL**
	Doing	150	101	**251**
	Watching	123	126	**249**
	TOTAL	**273**	**227**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning9

χ^2 (1) = 4.356, p =0.037; H_0 = rejected. There is observable difference in the responses H_0 has been rejected.

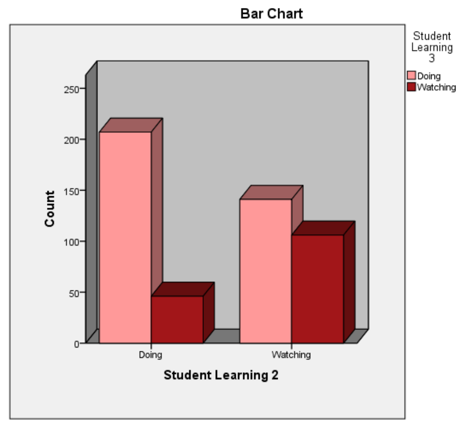


Section 2						
		Q8 – SL1 [df=1]				
		Critical value	χ^2	P Value	Y/N	H_0
	Q9 – SL2	1.642	1.566	.211	N	Accept
	Q10 – SL3		24.210	.000	Y	Reject
	Q11 – SL4		45.031	.001	Y	Reject
	Q12- SL5		28.165	.000	Y	Reject
	Q13 – SL6	3.841	4.356	.037	Y	Reject
	Q14 – SL7	1.642	1.917	.166	N	Accept
	Q15 – SL8		22.690	.000	Y	Reject
	Q16A – SL9	5.024	5.416	.020	Y	Reject

The two variables used were

SL2: Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people and **SL3: Doing** - I am flexible and open minded. **Watching** - I am careful and cautious.

χ^2 (1) = 36.135, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected.



	SL3		
		Doing	**Watching**
SL2	**Doing**	81.8%	18.2%
	Watching	57.1%	42.9%

Doing and Watching % within Student Learning 2

	SL3		
		Doing	**Watching**
SL2	**Doing**	59.3%	30.3 %
	Watching	40.5%	69.7%

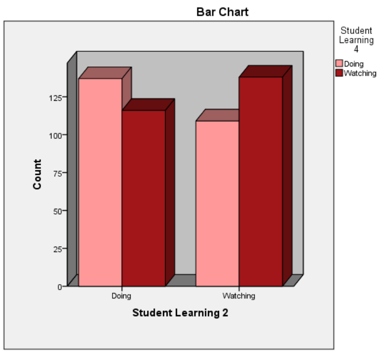
Doing and Watching % within Student Learning3

	SL3			
		Doing	Watching	**TOTAL**
SL2	Doing	207	46	**253**
	Watching	141	106	**247**
	TOTAL	**348**	**152**	**500**

Total Count Doing and Watching: Student Learning2 and Student Learning3

SL2: Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people and **SL4: Doing** - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it.

χ^2 (1) = 5.021, p =0.025; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected.



		SL4	
		Doing	**Watching**
SL2	**Doing**	54.2%	45.8%
	Watching	44.1%	55.9 %

Doing and Watching % within Student Learning 2

		SL4	
		Doing	**Watching**
SL2	**Doing**	55.7 %	45.7 %
	Watching	44.3%	54.3 %

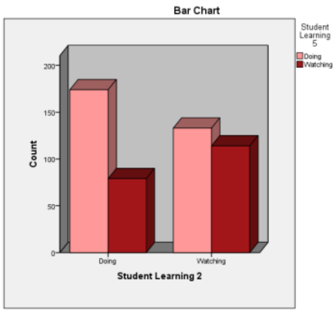
Doing and Watching % within Student Learning4

		SL4		
		Doing	Watching	**TOTAL**
SL2	Doing	**137**	**116**	**253**
	Watching	**109**	**138**	**247**
	TOTAL	**246**	**254**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning4

SL2: Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people and **SL5: Doing** - I am happy to have a go at new things. **Watching** - I draw up lists up possible courses of actions when starting a new project.

χ^2 (1) = 11.752, p =0.001; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected.



	SL5		
		Doing	**Watching**
SL2	**Doing**	68.8 %	31.2%
	Watching	53.8%	46.2%

Doing and Watching % within Student Learning 2

	SL5		
		Doing	**Watching**
SL2	**Doing**	56.7 %	40.9 %
	Watching	43.3%	59.1%

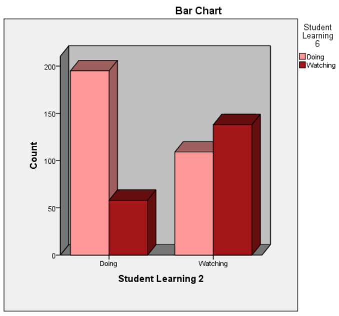
Doing and Watching % within Student Learning5

	SL5			
		Doing	Watching	**TOTAL**
SL2	Doing	174	79	**253**
	Watching	133	114	**247**
	TOTAL	**307**	**193**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning5

SL2: Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people and **SL6: Doing** - I like to get involved and to participate. **Watching** - I like to read and observe

χ^2 (1) = 56.918, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected.



		SL6	
		Doing	**Watching**
SL2	**Doing**	77.1%	22.9%
	Watching	44.1%	55.9 %

Doing and Watching % within Student Learning 2

		SL6	
		Doing	**Watching**
SL2	**Doing**	64.1 %	29.6%
	Watching	35.9%	70.4%

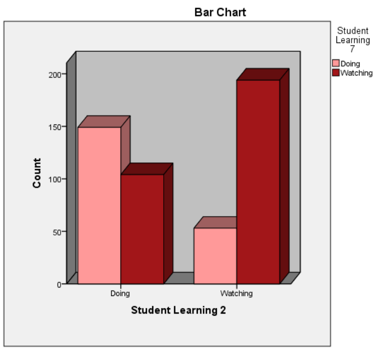
Doing and Watching % within Student Learning6

		SL6		
		Doing	Watching	**TOTAL**
SL2	Doing	195	58	**253**
	Watching	109	138	**247**
	TOTAL	**304**	**196**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning6

SL2: Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people and **SL7: Doing** - I am loud and outgoing. **Watching** - I am quiet and somewhat shy.

χ^2 (1) = 72.743, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected.



	SL7		
SL2		**Doing**	**Watching**
	Doing	58.9 %	41.1 %
	Watching	73.8%	34.9%

Doing and Watching % within Student Learning 2

	SL7		
SL2		**Doing**	**Watching**
	Doing	21.5%	78.5%
	Watching	26.2%	65.1%

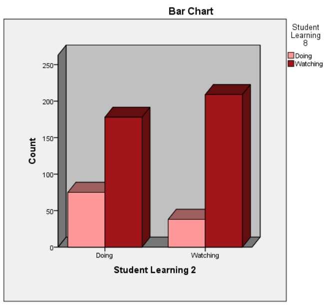
Doing and Watching % within Student Learning7

	SL7			
SL2		Doing	Watching	**TOTAL**
	Doing	149	104	**253**
	Watching	53	194	**247**
	TOTAL	**202**	**298**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning7

SL2: Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people and **SL8: Doing** - I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

χ^2 (1) = 14.528, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



	SL8		
		Doing	**Watching**
SL2	**Doing**	29.6%	70.4%
	Watching	66.4%	46.0%

Doing and Watching % within Student Learning 2

	SL8		
		Doing	**Watching**
SL2	**Doing**	66.4%	46.0%
	Watching	33.6%	54.0%

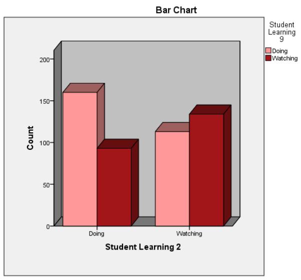
Doing and Watching % within Student Learning8

	SL8			
		Doing	Watching	**TOTAL**
SL2	Doing	75	178	**253**
	Watching	38	209	**247**
	TOTAL	**113**	**387**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning8

SL2: Doing - I am normally the one who initiates conversations. **Watching** - I enjoy watching people and **SL9: Doing** - I speak fast, while thinking. **Watching** - I speak slowly, after thinking.

χ^2 (1) = 15.427, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL2	SL9		
		Doing	**Watching**
	Doing	63.2%	36.8 %
	Watching	45.7%	54.3%

Doing and Watching % within Student Learning 2

SL2	SL9		
		Doing	**Watching**
	Doing	58.6%	54.3%
	Watching	41.4%	59.0%

Doing and Watching % within Student Learning9

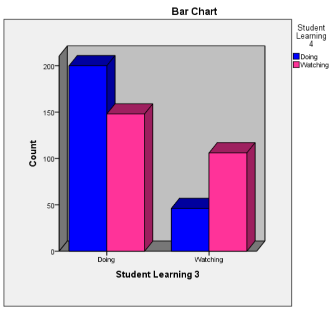
SL2	SL9			
		Doing	Watching	**TOTAL**
	Doing	160	93	**253**
	Watching	113	134	**247**
	TOTAL	**273**	**227**	**500**

Total Count Doing and Watching: Student Learning1 and Student Learning9

Section 2		Q9 – SL2 [df=1]				
		Critical value	χ^2	**P Value**	**Y/N**	H_0
	Q8 – SL1	1.642	1.566	.211	N	Accept
	Q10 – SL3		36.135	.000	Y	Reject
	Q11 – SL4	6.635	5.021	.021	Y	Reject
	Q12- SL5		11.752	.001	Y	Reject
	Q13 – SL6		56.918	.000	Y	Reject
	Q14 – SL7		72.743	.000	Y	Reject
	Q15 – SL8		14.528	.000	Y	Reject
	Q16A – SL9		15.427	.000	Y	Reject

SL3: Doing - I am flexible and open minded. **Watching** - I am careful and cautious **SL4: Doing** - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it.

χ^2 (1) = 31.334, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



	SL4		
SL3		**Doing**	**Watching**
	Doing	57.5%	42.5 %
	Watching	30.3%	69.7 %

Doing and Watching % within Student Learning 3

	SL4		
SL3		**Doing**	**Watching**
	Doing	81.3 %	58.3 %
	Watching	18.7 %	41.7 %

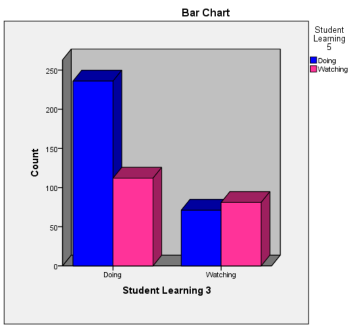
Doing and Watching % within Student Learning4

	SL4			
SL3		Doing	Watching	**TOTAL**
	Doing	200	148	**348**
	Watching	46	106	**152**
	TOTAL	**246**	**254**	**500**

Total Count Doing and Watching: Student Learning3 and Student Learning4

SL3: Doing - I am flexible and open minded. **Watching** - I am careful and cautious **SL5: Doing** - I am happy to have a go at new things. **Watching** - I draw up lists up possible courses of actions when starting a new project

χ^2 (1) = 19.888, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



	SL5		
		Doing	**Watching**
SL3	**Doing**	67.8%	32.2%
	Watching	46.7%	53.3%

Doing and Watching % within Student Learning 3

	SL5		
		Doing	**Watching**
SL3	**Doing**	76.9%	58.0%
	Watching	23.1%	42.0%

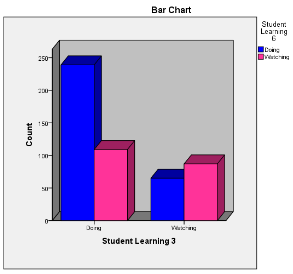
Doing and Watching % within Student Learning5

	SL5			
		Doing	Watching	**TOTAL**
SL3	Doing	236	112	**348**
	Watching	71	81	**152**
	TOTAL	**307**	**193**	**500**

Total Count Doing and Watching: Student Learning3 and Student Learning5

SL3: **Doing** - I am flexible and open minded. **Watching** - I am careful and cautious
SL6: **Doing –** I like to get involved and to participate. **Watching** - I like to read and observe

χ^2 (1) = 29.810, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



	SL6		
SL3		**Doing**	**Watching**
	Doing	68.7 %	31.3%
	Watching	42.8%	57.2%

Doing and Watching % within Student Learning 3

	SL6		
SL3		**Doing**	**Watching**
	Doing	78.6 %	55.6 %
	Watching	21.4 %	44.4 %

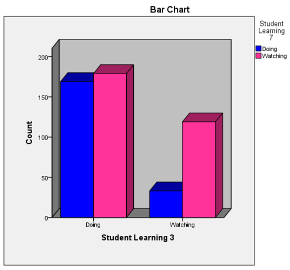
Doing and Watching % within Student Learning6

	SL6			
SL3		Doing	Watching	**TOTAL**
	Doing	239	109	**348**
	Watching	65	87	**152**
	TOTAL	**304**	**196**	**500**

Total Count Doing and Watching: Student Learning3 and Student Learning6

SL3: **Doing** - I am flexible and open minded. **Watching** - I am careful and cautious
SL7: **Doing** - I am loud and outgoing. **Watching** - I am quiet and somewhat shy

χ^2 (1) = 29.810, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL3	SL7		
		Doing	**Watching**
	Doing	48.6%	51.4 %
	Watching	21.7 %	78.3 %

Doing and Watching % within Student Learning 3

SL3	SL7		
		Doing	**Watching**
	Doing	83.7 %	60.1 %
	Watching	16.3 %	39.9 %

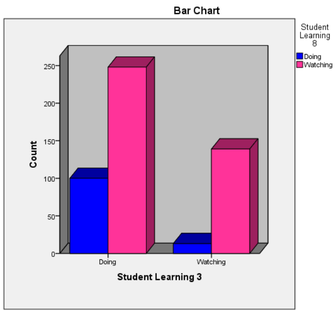
Doing and Watching % within Student Learning7

SL3	SL7			
		Doing	Watching	**TOTAL**
	Doing	169	179	**348**
	Watching	33	119	**152**
	TOTAL	**202**	**298**	**500**

Total Count Doing and Watching: Student Learning3 and Student Learning7

SL3: **Doing** - I am flexible and open minded. **Watching** - I am careful and cautious **SL8:** **Doing** - I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

χ^2 (1) = 24.636, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



	SL8		
SL3		**Doing**	**Watching**
	Doing	28.7 %	71.3 %
	Watching	8.6 %	91.4 %

Doing and Watching % within Student Learning 3

	SL8		
SL3		**Doing**	**Watching**
	Doing	88.5%	64.1%
	Watching	11.5%	35.9%

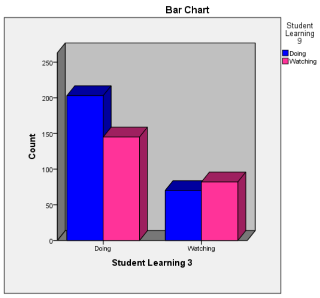
Doing and Watching % within Student Learning8

	SL8			
SL3		Doing	Watching	**TOTAL**
	Doing	100	248	**348**
	Watching	13	139	**152**
	TOTAL	**113**	**387**	**500**

Total Count Doing and Watching: Student Learning3 and Student Learning8

SL3: **Doing** - I am flexible and open minded. **Watching** - I am careful and cautious
SL9: **Doing** - I speak fast, while thinking. **Watching** - I speak slowly, after thinking.

χ^2 (1) = 6.437, p =0.011; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



		SL9	
		Doing	**Watching**
SL3	**Doing**	58.3%	41.7%
	Watching	46.1%	53.9%

Doing and Watching % within Student Learning 3

		SL9	
		Doing	**Watching**
SL3	**Doing**	74.4%	63.9%
	Watching	25.6%	36.1%

Doing and Watching % within Student Learning9

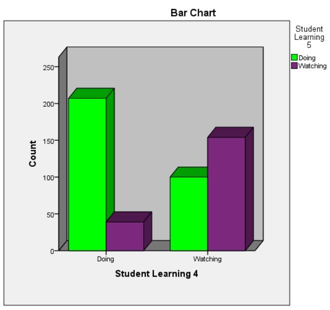
		SL9		
		Doing	Watching	**TOTAL**
SL3	Doing	203	145	**348**
	Watching	70	82	**152**
	TOTAL	**273**	**227**	**500**

Total Count Doing and Watching: Student Learning3 and Student Learning9

		Q10 – SL3 [df=1]				
		Critical value	χ^2	**P Value**	**Y/N**	H_0
Section 2	Q8 – SL1		24.210	.000	Y	Reject
	Q9 – SL2	1.642	1.566	.211	N	Accept
	Q11 – SL4		31.334	.000	Y	Reject
	Q12- SL5		19.883	.000	Y	Reject
	Q13 – SL6		29.810	.000	Y	Reject
	Q14 – SL7		31.681	.000	N	Accept
	Q15 – SL8		24.636	.000	Y	Reject
	Q16A – SL9	6.635	6.437	.011	Y	Reject

SL4: Doing - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it **SL5: Doing** - I am happy to have a go at new things. **Watching** - I draw up lists up possible courses of actions when starting a new project.

χ^2 (1) = 105.716, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL4	SL5		
		Doing	**Watching**
	Doing	84.1 %	15.9 %
	Watching	39.4 %	60.6 %

Doing and Watching % within Student Learning 4

SL4	SL5		
		Doing	**Watching**
	Doing	67.4 %	20.2 %
	Watching	32.6 %	79.8 %

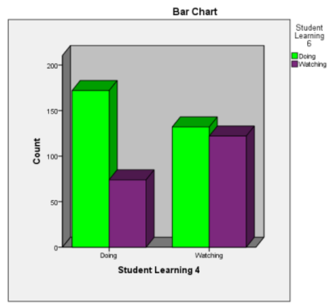
Doing and Watching % within Student Learning5

SL4	SL5			
		Doing	Watching	**TOTAL**
	Doing	207	39	**246**
	Watching	100	154	**254**
	TOTAL	**307**	**193**	**500**

Total Count Doing and Watching: Student Learning4 and Student Learning5

SL4: Doing - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it **SL6: Doing** - I like to get involved and to participate. **Watching** - I like to read and observe

χ^2 (1) = 16.895, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



	SL6		
SL4		**Doing**	**Watching**
	Doing	69.9 %	30.1 %
	Watching	52.0 %	48.0 %

Doing and Watching % within Student Learning 4

	SL6		
SL4		**Doing**	**Watching**
	Doing	56.6 %	37.8 %
	Watching	43.4 %	62.2%

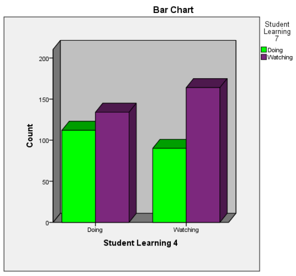
Doing and Watching % within Student Learning6

	SL6			
SL4		Doing	Watching	**TOTAL**
	Doing	172	74	**246**
	Watching	132	122	**254**
	TOTAL	**304**	**196**	**500**

Total Count Doing and Watching: Student Learning4 and Student Learning6

SL4: Doing - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it **SL7: Doing** - I am loud and outgoing. **Watching** - I am quiet and somewhat shy.

χ^2 (1) = 5.290, p =0.021; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



	SL7		
SL4		**Doing**	**Watching**
	Doing	45.5 %	54.5 %
	Watching	35.4 %	64.6 %

Doing and Watching % within Student Learning 4

	SL7		
SL4		**Doing**	**Watching**
	Doing	55.4 %	45.0 %
	Watching	44.6 %	55.5 %

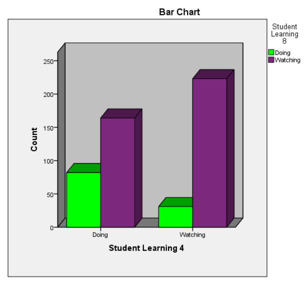
Doing and Watching % within Student Learning7

	SL7			
SL4		Doing	Watching	**TOTAL**
	Doing	112	134	**246**
	Watching	90	164	**254**
	TOTAL	**202**	**298**	**500**

Total Count Doing and Watching: Student Learning4 and Student Learning7

SL4: Doing - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it **SL8: Doing** – I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

χ^2 (1) = 31.893, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



	SL8		
		Doing	**Watching**
SL4	**Doing**	33.3 %	66.7 %
	Watching	12.2%	87.8 %

Doing and Watching % within Student Learning 4

	SL8		
		Doing	**Watching**
SL4	**Doing**	72.6 %	42.4 %
	Watching	27.4 %	57.6 %

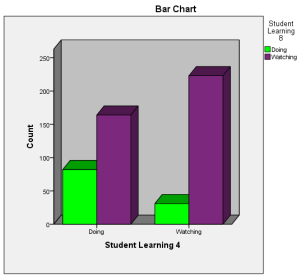
Doing and Watching % within Student Learning8

	SL8			
		Doing	Watching	**TOTAL**
SL4	Doing	82	164	**246**
	Watching	31	223	**254**
	TOTAL	**113**	**387**	**500**

Total Count Doing and Watching: Student Learning4 and Student Learning8

SL4: Doing - I like to try new and different things without too much preparation. **Watching** - I investigate a new topic or process in depth before trying it **SL9: Doing** – I speak fast, while thinking. **Watching** - I speak slowly, after thinking.

χ^2 (1) = 12.508, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL4	SL9		
		Doing	**Watching**
	Doing	62.6 %	37.4 %
	Watching	46.9 %	53.1 %

Doing and Watching % within Student Learning 4

SL4	SL9		
		Doing	**Watching**
	Doing	56.4 %	40.5 %
	Watching	43.6 %	59.5 %

Doing and Watching % within Student Learning9

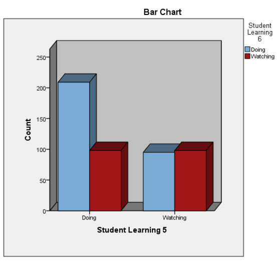
SL4	SL9			
		Doing	Watching	**TOTAL**
	Doing	154	92	**246**
	Watching	119	135	**254**
	TOTAL	**273**	**227**	**500**

Total Count Doing and Watching: Student Learning4 and Student Learning9

Section 2						
		Q11 – SL4 [df=1]				
		Critical value	χ^2	**P Value**	**Y/N**	H_0
	Q8 – SL1		45.031	.001	Y	Reject
	Q9 – SL2	5.024	5.021	.025	Y	Reject
	Q10 – SL3		31.334	.000	Y	Reject
	Q12- SL5		105.716	.000	Y	Reject
	Q13 – SL6		16.895	.000	Y	Reject
	Q14 – SL7	5.024	5.290	.021	Y	Reject
	Q15 – SL8		31.893	.000	Y	Reject
	Q16A – SL9		12.508	.000	Y	Reject

SL5: Doing - I am happy to have a go at new things. **Watching** - I draw up lists of possible courses of actions when starting a new project **SL6: Doing** – I like to get involved and to participate. **Watching** - I like to read and observe

χ^2 (1) = 17.677, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



	SL6		
SL5		**Doing**	**Watching**
	Doing	68.1 %	31.9 %
	Watching	49.2 %	50.8 %

Doing and Watching % within Student Learning 5

	SL6		
SL5		**Doing**	**Watching**
	Doing	68.8%	50.0 %
	Watching	31.2 %	50.0 %

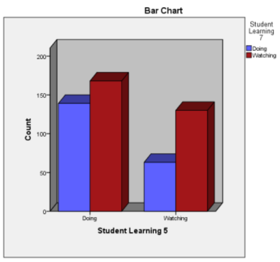
Doing and Watching % within Student Learning6

	SL6			
SL5		Doing	Watching	**TOTAL**
	Doing	209	98	**246**
	Watching	95	98	**254**
	TOTAL	**304**	**196**	**500**

Total Count Doing and Watching: Student Learning5 and Student Learning6

SL5: Doing - I am happy to have a go at new things. **Watching** - I draw up lists of possible courses of actions when starting a new project **SL7: Doing** - I am loud and outgoing. **Watching** - I am quiet and somewhat shy

χ^2 (1) = 7.856, p =0.005; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL5	SL7		
		Doing	**Watching**
	Doing	45.3 %	54.7 %
	Watching	32.6 %	67.4%

Doing and Watching % within Student Learning 5

SL5	SL7		
		Doing	**Watching**
	Doing	68.8 %	56.4 %
	Watching	31.2 %	43.6 %

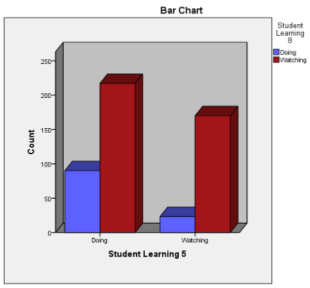
Doing and Watching % within Student Learning7

SL5	SL7			
		Doing	Watching	**TOTAL**
	Doing	139	168	**246**
	Watching	63	130	**254**
	TOTAL	**202**	**298**	**500**

Total Count Doing and Watching: Student Learning5 and Student Learning7

SL5: Doing - I am happy to have a go at new things. **Watching** - I draw up lists of possible courses of actions when starting a new project **SL8: Doing** - I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

χ^2 (1) = 20.508, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL5	SL8		
		Doing	**Watching**
	Doing	29.3 %	70.7 %
	Watching	11.9 %	88.1 %

Doing and Watching % within Student Learning 5

SL5	SL8		
		Doing	**Watching**
	Doing	79.6 %	56.1 %
	Watching	20.4 %	43.9%

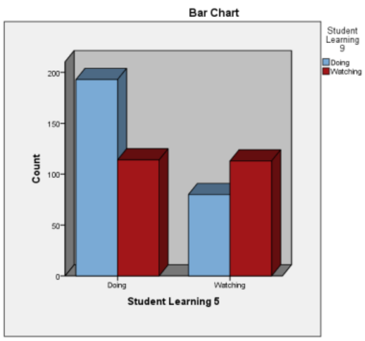
Doing and Watching % within Student Learning8

SL5	SL8			
		Doing	Watching	**TOTAL**
	Doing	90	217	**246**
	Watching	23	170	**254**
	TOTAL	**113**	**387**	**500**

Total Count Doing and Watching: Student Learning5 and Student Learning8

SL5: Doing - I am happy to have a go at new things. **Watching** - I draw up lists of possible courses of actions when starting a new project **SL9: Doing** - I speak fast, while thinking. **Watching** - I speak slowly, after thinking

χ^2 (1) = 21.925, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL5	SL9		
		Doing	**Watching**
	Doing	62.9 %	37.1 %
	Watching	41.5 %	58.5 %

Doing and Watching % within Student Learning 5

SL5	SL9		
		Doing	**Watching**
	Doing	70.7 %	50.2 %
	Watching	29.3 %	49.8 %

Doing and Watching % within Student Learning9

SL5	SL9			
		Doing	Watching	**TOTAL**
	Doing	193	114	**246**
	Watching	80	113	**254**
	TOTAL	**273**	**227**	**500**

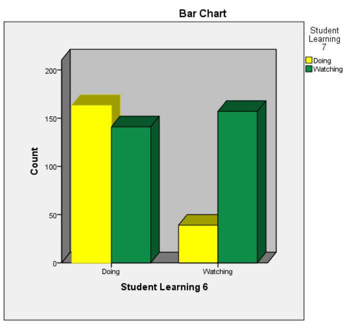
Total Count Doing and Watching: Student Learning5 and Student Learning9

Section 2						
		Q12 – SL5 [df=1]				
		Critical value	χ^2	**P Value**	**Y/N**	H_0
	Q8 – SL1		28.165	.000	Y	Reject
	Q9 – SL2		11.752	.001	Y	Reject
	Q10 – SL3		19.883	.000	Y	Reject
	Q11- SL4		105.716	.000	Y	Reject
	Q13 – SL6		17.677	.000	Y	Reject
	Q14 – SL7	6.635	7.856	.005	Y	Reject
	Q15 – SL8		20.508	.000	Y	Reject
	Q16A – SL9		21.925	.000	Y	Reject

SL6: Doing – I like to get involved and to participate. **Watching** - I like to read and observe

SL7: Doing - I am loud and outgoing. **Watching** - I am quiet and somewhat shy

χ^2 (1) = 56.275, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL6	SL7		
		Doing	**Watching**
	Doing	53.6 %	46.4 %
	Watching	19.9 %	80.1 %

Doing and Watching % within Student Learning 6

SL6	SL7		
		Doing	**Watching**
	Doing	80.7 %	47.3 %
	Watching	19.3 %	52.7 %

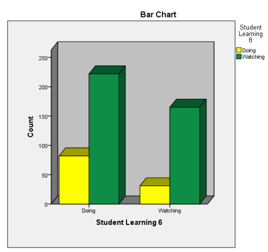
Doing and Watching % within Student Learning9

SL6	SL7			
		Doing	Watching	**TOTAL**
	Doing	163	141	**246**
	Watching	39	157	**254**
	TOTAL	**202**	**298**	**500**

Total Count Doing and Watching: Student Learning6 and Student Learning9

SL6: Doing – I like to get involved and to participate. **Watching** - I like to read and observe
SL8: Doing - I make quick and bold decisions. **Watching** - I make cautious and logical decisions

χ^2 (1) = 8.481, p =0.004; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL6	SL8		
		Doing	**Watching**
	Doing	27.0 %	73.0 %
	Watching	15.8 %	84.2 %

Doing and Watching % within Student Learning 6

SL6	SL8		
		Doing	**Watching**
	Doing	72.8 %	57.4 %
	Watching	27.4 %	42.6 %

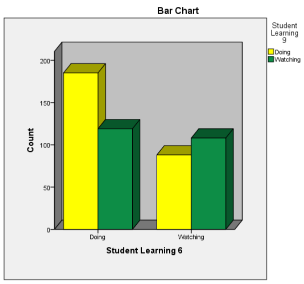
Doing and Watching % within Student Learning8

SL6	SL8			
		Doing	Watching	**TOTAL**
	Doing	82	222	**246**
	Watching	31	165	**254**
	TOTAL	**113**	**387**	**500**

Total Count Doing and Watching: Student Learning6 and Student Learning8

SL6: Doing – I like to get involved and to participate. **Watching** - I like to read and observe
SL9: Doing - I speak fast, while thinking. **Watching** - I speak slowly, after thinking

χ^2 (1) = 12.241, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL6	SL9		
		Doing	**Watching**
	Doing	60.9 %	39.1 %
	Watching	44.9 %	55.1 %

Doing and Watching % within Student Learning 6

SL6	SL9		
		Doing	**Watching**
	Doing	67.8 %	52.4 %
	Watching	32.2 %	47.6 %

Doing and Watching % within Student Learning9

SL6	SL9			
		Doing	Watching	**TOTAL**
	Doing	185	119	**246**
	Watching	88	108	**254**
	TOTAL	**273**	**227**	**500**

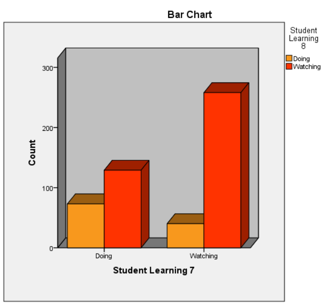
Total Count Doing and Watching: Student Learning6 and Student Learning9

Section 2						
		Q13 – SL6 [df=1]				
		Critical value	χ^2	**P Value**	**Y/N**	H_0
	Q8 – SL1	3.841	4.356	.037	Y	Reject
	Q9 – SL2		56.918	.000	Y	Reject
	Q10 – SL3		29.810	.000	Y	Reject
	Q11- SL4		16.895	.000	Y	Reject
	Q12 – SL5		17.677	.000	Y	Reject
	Q14 – SL7		56.275	.000	Y	Reject

	Q15 – SL8		8.481	.004	Y	Reject
	Q16A – SL9		12.241	.000	Y	Reject

SL7: Doing - I am loud and outgoing. **Watching** - I am quiet and somewhat shy **SL8: Doing** - I make quick and bold decisions. **Watching** - I make cautious and logical decisions.

χ^2 (1) = 35.514, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL7	SL8		
		Doing	**Watching**
	Doing	36.1 %	63.9 %
	Watching	13.4 %	86.6 %

Doing and Watching % within Student Learning 7

SL7	SL8		
		Doing	**Watching**
	Doing	64.6 %	33.3 %
	Watching	35.4 %	66.7 %

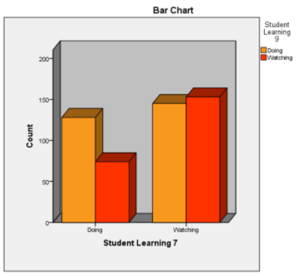
Doing and Watching % within Student Learning8

SL7	SL8			
		Doing	Watching	**TOTAL**
	Doing	73	129	**202**
	Watching	40	258	**298**
	TOTAL	**113**	**387**	**500**

Total Count Doing and Watching: Student Learning7 and Student Learning8

SL7: Doing - I am loud and outgoing. **Watching** - I am quiet and somewhat shy **SL9: Doing** - I speak fast, while thinking. **Watching** - I speak slowly, after thinking

χ^2 (1) = 10.507, p =0.001; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL7	SL9		
		Doing	**Watching**
	Doing	63.4 %	36.6 %
	Watching	48.7 %	51.3 %

Doing and Watching % within Student Learning 7

SL7	SL9		
		Doing	**Watching**
	Doing	46.9 %	32.6 %
	Watching	53.1 %	67.4 %

Doing and Watching % within Student Learning9

SL7	SL9			
		Doing	Watching	**TOTAL**
	Doing	128	74	**202**
	Watching	145	153	**298**
	TOTAL	**273**	**227**	**500**

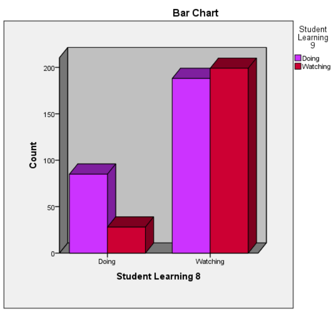
Total Count Doing and Watching: Student Learning7 and Student Learning9

Section 2						
		Q14 – SL7 [df=1]				
		Critical value	χ^2	**P Value**	**Y/N**	H_0
	Q8 – SL1	1.642	1.917	.166	N	Accept
	Q9 – SL2		72.743	.000	Y	Reject
	Q10 – SL3		31.681	.000	Y	Reject
	Q11- SL4	1.642	5.290	.021	Y	Reject
	Q12 – SL5	6.635	7.856	.005	Y	Reject
	Q13 – SL6		56.275	.000	Y	Reject

	Q15 – SL8		35.514	.000	Y	Reject
	Q16A – SL9		10.507	.001	Y	Reject

SL8: **Doing** - I make quick and bold decisions. **Watching** - I make cautious and logical decisions **SL9: Doing** - I speak fast, while thinking. **Watching** - I speak slowly, after thinking

χ^2 (1) = 25.045, p =0.000; H_0 = rejected. There is observable difference in the responses therefore H_0 has been rejected



SL8	SL9		
		Doing	**Watching**
	Doing	75.2 %	24.8 %
	Watching	48.6 %	51.4 %

Doing and Watching % within Student Learning 8

SL8	SL9		
		Doing	**Watching**
	Doing	31.1 %	12.3 %
	Watching	68.9 %	87.7 %

Doing and Watching % within Student Learning9

SL8	SL			
		Doing	Watching	**TOTAL**
	Doing	85	28	**113**
	Watching	188	199	**387**
	TOTAL	**273**	**227**	**500**

Total Count Doing and Watching: Student Learning8 and Student Learning9

Section 2		Q15 – SL8 [df=1]				
		Critical value	χ^2	**P Value**	**Y/N**	H_0
	Q8 – SL1		22.690	.000	Y	Reject
	Q9 – SL2		14.528	.000	Y	Reject
	Q10 – SL3		24.636	.000	Y	Reject
	Q11- SL4		31.893	.000	Y	Reject
	Q12 – SL5		20.504	.000	Y	Reject
	Q13 – SL6		8.481	.004	Y	Reject
	Q14 – SL7		35.514	.000	Y	Reject
	Q16A – SL9		25.045	.000	Y	Reject

		Section 1															
		Q1 Area of Study [df=1]					Q2 Year of Study [df=4]					Q3 Option of Study [df= 2]					
		Critical value	X^2	P Value	Y/ N	H_0	Critical value	X^2	P value	Y/ N	H_0	Critical value	X^2	P value	Y/ N	H_0	Ques
Section 2	Q8	2.706	2.733	.098	N	Accept	13.277	13.791	.008	Y	Reject	9.210	14.818	.001	Y	Reject	Q8
	Q9	3.841	4.551	.033	Y	Reject	5.989	5.703	.222	N	Accept	.446	.780	.677	N	Accept	Q9
	Q10	2.706	2.094	.148	N	Accept	1.649	1.620	.805	N	Accept	3.219	2.916	.233	N	Accept	Q10
	Q11	2.706	2.597	.107	N	Accept	5.989	4.974	.290	N	Accept	.211	.270	.874	N	Accept	Q11
	Q12	1.642	1.311	.252	N	Accept	11.143	11.167	.025	Y	Reject	4.605	4.949	.084	N	Accept	Q12
	Q13	2.706	2.590	.108	N	Accept	7.779	6.779	.148	N	Accept	3.219	2.921	.232	N	Accept	Q13
	Q14	5.024	5.643	.018	Y	Reject	5.989	5.704	.222	N	Accept	.446	.711	.701	N	Accept	Q14
	Q15	3.841	3.280	.070	N	Accept	1.649	3.227	.521	N	Accept	.211	.196	.907	N	Accept	Q15
Section 3	Q16A	.0642	.286	.593	N	Accept	1.649	1.998	.736	N	Accept	9.210	9.551	.008	Y	Reject	Q16A
	Q16b	.796	.0642	.372	N	Accept	1.649	3.251	.571	N	Accept	3.219	1.588	.457	N	Accept	Q16B
	Q17	5.024	4.915	.027	Y	Reject	9.488	10.000	.040	Y	Reject	4.605	4.728	.094	Y	Accept	Q17
	Q18		17.951	.001	Y	Reject	7.779	7.026	.135	N	Accept	5.991	6.549	.038	Y	Reject	Q18
	Q19	6.635	6.485	.011	Y	Reject	7.779	6.855	.144	N	Accept	9.210	4.865	.088	Y	Accept	Q19
	Q20	.0642	.524	.469	N	Accept	1.649	1.434	.838	N	Accept	3.219	1.153	.562	N	Accept	Q20
	Q21	2.706	2.347	.126	N	Accept	5.989	6.571	.160	N	Accept	.103	.072	.962	N	Accept	Q21
	Q22	1.642	1.127	.288	N	Accept	7.779	7.329	.119	N	Accept	4.605	4.284	.117	Y	Accept	Q22
	Q23	.0642	.463	.496	N	Accept	1.649	3.716	.446	N	Accept	3.219	2.173	.337	Y	Accept	Q23
	Q24	1.642	1.557	.212	N	Accept	1.649	2.307	.679	N	Accept	3.219	2.611	.271	Y	Accept	Q24

Legend
Critical Value
X^2 = Chi-Square value
Statistical difference
Y – Reject Null hypothesis (statistically difference)
N – Accept Null hypothesis (no statistically difference)

IF Pvalue <= 0.05 THEN
Reject H_0 {Y - statistically difference}

ELSE
IF Pvalue > 0.05 THEN
Accept H_0 {N- no statistically difference}
{endif}
H_0 = there is no significant difference between the observed and expected frequencies ie the variables are independent of each other

	Section 1																	
		Q4 Age Group					Q5 IT Skills at Start [df=3]					Q6 IT Skills at Present					Ques
		Critical value	X^2	P Value	Y/N	H_0	Critical value	X^2	P value	Y/N	H_0	Critical value	X^2	P value	Y/N	H_0	
Section 2	Q8				N	Accept	1.005	1.5737	.674	N	Accept	1.005	2.429	.488	N	Accept	Q8
	Q9						11.345	13.030	.005	Y	Reject	6.251	6.047	.109	N	Accept	Q9
	Q10						6.251	5.827	.120	N	Accept	1.005	1.369	.713	N	Accept	Q10
	Q11						11.345	11.143	.001	Y	Reject	9.348	8.459	.037	N	Accept	Q11
	Q12						1.005	1.283	.733	N	Accept	1.005	2.253	.522	N	Accept	Q12
	Q13						11.345	11.488	.009	Y	Reject	1.005	2.235	.525	N	Accept	Q13
	Q14						4.642	5.027	.170	N	Accept	1.005	1.704	.636	N	Accept	Q14
	Q15						6.251	6.133	.105	N	Accept	6.251	6.735	.081	N	Accept	Q15
	Q16A						1.005	2.194	.533	N	Accept	1.005	1.544	.672	N	Accept	Q16a
Section 3	Q16b						1.005	2.400	.494	N	Accept	1.005	1.775	.620	N	Accept	Q16b
	Q17						7.815	8.263	.041	Y	Reject	6.251	6.009	.111	N	Accept	Q17
	Q18						1.005	.941.	.816	N	Accept	1.005	1.708	.635	N	Accept	Q18
	Q19						1.005	2.143	.543	N	Accept	1.005	1.679	.642	N	Accept	Q19
	Q20						1.005	2.299	.513	N	Accept	.352	.457	.928	N	Accept	Q20
	Q21						4.642	3.175	.365	N	Accept	1.005	1.436	.697	N	Accept	Q21
	Q22						4.642	3.535	.316	N	Accept	1.005	1.351	.717	N	Accept	Q22
	Q23						9.348	8.991	.029	Y	Reject	11.345	12.568	.006	Y	Reject	Q23
	Q24						1.005	2.218	.528	N	Accept	1.005	2.744	.433	N	Accept	Q24

Legend
Critical Value
X^2 = Chi-Square value
Statistical difference
Y – Reject Null hypothesis (statistically difference)
N – Accept Null hypothesis (no statistically difference)

IF Pvalue <= 0.05 THEN
Reject H_0 {Y - statistically difference}

ELSE
IF Pvalue > 0.05 THEN
Accept H_0 {N- no statistically difference}
{endif}
H_0 = there is no significant difference between the observed and expected frequencies ie the variables are independent of each other